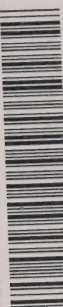


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# MEMORANDUM

RELATING TO

## The Hudson Bay Territory

NORTH OF THE

Province of Ontario



TORONTO :

Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty  
1905



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# MEMORANDUM

RELATING TO

## The Hudson Bay Territory

NORTH OF THE

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1905



WARWICK BRO'S & RUTTER, LIMITED, PRINTERS  
TORONTO

Legislative Library, 15 May, 1905.

HON. J. P. WHITNEY, *Premier and Attorney-General.*

DEAR SIR,—At your direction, I have gone over the books and documents in the Library and have extracted passages relating to that part of what was formerly Hudson Bay Territory, which lies north of the Province of Ontario.

Herewith, I have the honour to transmit to you the material extracted.

There is no lack of matter relating to the waters of Hudson Bay, and to the land immediately bordering on the rivers, lakes and sea shore. I have selected that which appeared to me to be fairly representative of the whole. To have increased the bulk of it would merely have involved repetition.

There is almost an entire absence of any information as to the character of the land lying between the several canoe routes. In fact, nearly the whole of the country immediately north of Ontario is contained within the areas which Dr. Dawson in a paper herein quoted describes as "Unexplored Areas."

It may fairly be inferred, however, that the parts immediately north of Ontario consist largely of clay land, singularly level and in need of drainage, and thickly wooded with black and white spruce, balsam, cedar, larch, poplar, birch, willow, etc. A part of it promises great mineral wealth.

As to navigation, there appears to be complete agreement among all the writers that there is no harbour of any account on the western shore, south of Churchill.

Yours faithfully,

Avern Pardoe,

Librarian.

## SUGGESTIONS.

I think a parallel of latitude would form a better northern boundary than a river. River boundaries have led to frequent disputes. Sometimes there is doubt as to which river is meant. Sometimes the true river—that is to say the longest tributary cannot be ascertained without costly survey,—for instance, the source of the Mississippi was in doubt for many years, and then the wrong one was chosen and agreed upon.

Islands intersected by boundary, either river or parallel, should belong to that jurisdiction in which the greater part of the Island lies.

The Eastern boundary should be the present eastern boundary produced until intersected by northern boundary; islands intersected to belong to the jurisdiction in which the greater part of the island lies.

I suppose the procedure would be by an enabling act followed by a proclamation; and legislation and proclamation by the Province whose boundaries are changed.

Query,—would the Ontario Government on the Annexation, become automatically the possessor of the Crown Lands, mines, minerals, timber, etc? or would a conveyance from the Dominion Government be necessary? having regard to the fact that the Dom. Government now holds the lands by actual purchase as well as by representing the Crown?

## HUDSON BAY.

Including its southern prolongation, James Bay, Hudson Bay measures 1000 miles from north to south, and is more than 600 miles across in the northern part. Its total area is about 500,000 square miles which is about half as large as the Mediterranean.

Hudson Straits, its principal outlet, is about 500 miles long with an average width of about 100 miles.

Including the Winnipeg system the basin of the Hudson Bay has an extreme width of about 2100 miles from east to west and an extreme depth of about 1500 miles from north to south, and its dimensions may reach a million and a half of square miles.

Both Bay and Straits are remarkably free from rocks and shoals which might interfere with navigation; except that the western shore, south of the mouth of the Nelson is shoaly along almost its entire length.

The main portion of Hudson Bay, the portion which may hereafter be frequented by shipping is entirely without shoals, reefs or islands.

The depth is very uniform over most of the Bay and nowhere does it present any great irregularities. It averages about 70 fathoms throughout, deepening to 100 and upwards on approaching Hudson Strait, while in the Strait itself the soundings along the centre vary from 100 to upwards of 300 fathoms. The bottom appears to consist almost everywhere of boulder clay and mud.



Near the shores a stiff clay affording a good holding ground for anchors is almost invariably met with on both sides.

The country on the southwest shore of the main bay, as well as of James Bay, is low and generally level with shallow water extending a long distance from shore.

### JAMES' BAY.

The shores of James' Bay from the eastern boundary of Ontario to the Albany River, are low and flat and the bay is exceedingly shallow.

The group of islands near the east side are surrounded by deep water and a wide channel leads up the centre of James Bay.

James Bay, begins at Cape Jones on the east side and Cape Henrietta Maria on the west and runs south about 350 miles, with an average breadth of 150 miles. The country on the southwest side of the main bay as well as that lying to the west of James Bay, is low and generally level with shallow water extending a long distance from shore.

### RIVERS.

About 30 large rivers run into Hudson Bay, and many smaller ones.

Among those entering from the west, north of the present boundary of Ontario are the Albany and the Churchill, which are the longest; and the Nelson with a course (under that name) of only about 400 miles but which discharges the greatest body of water. The Nelson in its entirety may be considered one of the greatest rivers in the world. It drains the immense Winnipeg system, some of the sources of which, namely, the head waters of the Red River, draw from as far south as Lat. 45 deg. and as far west as the Rocky Mountains.

Few of the great rivers of Hudson Bay afford uninterrupted navigation for large vessels to any great distance from the Coast.

The Hayes River, at the mouth of which York Factory is situated, and two of its branches, might apparently be navigated by shallow draught steamers in the spring for about 140 miles inland.

The Albany is said to be navigable in spring for light draught steamers for 250 miles.

The Nelson is a muddy stream, the only one of this character entering on the west side. It may be navigable for steamers of considerable size for 70 or 80 miles from the open sea.

The Churchill which is the second largest river of Hudson's Bay is a clear water stream, having at its mouth a splendid harbour with deep water and every natural advantage for the purposes of modern commerce.

The only harbours on the west side of Hudson's Bay are those formed by the mouths of the rivers, but none of them with the exception of the Churchill



Harbour can be entered by vessels drawing more than ten or eleven feet, and only at high water even by these. The Nelson may form an exception to this. Most of its estuary becomes dry at low tide but a channel runs through it near the centre as far as the head of tide water. In continuation of the channel running down the estuary, a "lead" of deeper water extends out into the Bay and forms the North River or York Roads with excellent anchorage.

The Churchill, unlike all the other rivers has a deep, rocky and comparatively narrow mouth which can be entered with ease and safety by the largest ships at all stages of the tide. The ruins of Fort Prince of Wales stand on the west side of the entrance of the harbour. Along the west coast the rise and fall at spring tides amount to about eleven or twelve feet on the average and is pretty uniform, diminishing somewhat towards the south. Its greatest rise is at the mouth of the Nelson where it is about 15 feet.

#### RIVERS ENTERING HUDSON BAY ON THE WEST, GOING NORTH FROM FORT ALBANY TO LAT. 60 N.

|  |                   |
|--|-------------------|
| Albany, River, approximate latitude of mouth | 52 deg. 20 min.   |
| Kapiskan,                                    | " 52 deg. 47 min. |
| Attawapishkat,                               | " 53 deg.         |
| Ekwan,                                       | " 53 deg. 15 min. |
| Raft,  | " 53 deg. 36 min. |
| Opinnagau,                                   | " 54 deg. 15 min. |
| Nemekus,                                     | " 55 deg.         |
| Trout, (Cape Lookout),                       | " 55 deg. 13 min. |
| Winisk,                                      | " 55 deg. 25 min. |
| Shagamu,                                     | " 55 deg. 45 min. |
| Shell,                                       | " 55 deg. 53 min. |
| Beaver,                                      | " 55 deg. 55 min. |
| Goose,                                       | " 55 deg. 58 min. |
| Severn,                                      | " 56 deg.         |
| Bacon,                                       | " 56 deg. 5 min.  |
| Pipanton,                                    | " 56 deg. 10 min. |
| Opuchi,                                      | " 56 deg. 15 min. |
| Black Currant,                               | " 56 deg. 20 min. |
| Wolf,  | " 56 deg. 38 min. |
| Hairy,                                       | " 56 deg. 46 min. |
| Black Duck,                                  | " 56 deg. 55 min. |
| Milk,  | " 56 deg. 57 min. |
| Kettle,                                      | " 57 deg.         |
| Kaskattama,                                  | " 57 deg. 12 min. |
| Ship,  | " 57 deg. 10 min. |
| Stony,                                       | " 57 deg. 7 min.  |
| Fourteens,                                   | " 57 deg. 6 min.  |
| Hayes River, (York Factory),                 | " 57 deg.         |
| Nelson River,                                | " 57 deg.         |
| Owl,   | " 57 deg. 55 min. |
| Broad,                                       | " 58 deg. 8 min.  |
| Churchill,                                   | " 58 deg. 45 min. |
| Seal,  | " 59 deg. 3 min.  |



THE WEST COAST OF HUDSON BAY GOING NORTH FROM ALBANY  
RIVER TO CHURCHILL.

Arthur Dobbs, writing in 1744, "An Account of the Countries adjoining to Hudson's Bay,"—an account designed to promote a voyage for the discovery of the northwest Passage gives an account of the rivers entering the Bay, from which the following description of the Rivers between the Albany and Churchill is taken:—

"Albany River is also very considerable in Lat. 52 deg., and cometh from W.S.W. and within land has the same climate and other advantages; at present the situation of the Factories of Moose and Albany are very unhappy, being placed in the swamps, at the mouths of the Rivers; for the Company's chief aim being trade, they don't regard the soil, aspect or situation, where they fix them, provided they are upon navigable Rivers where their ships can approach them, and where the natives can come in their canoes; so that their factories there, are placed in a low swampy ground, which is overflowed by the rivers upon the breaking up of the ice, which makes them much moister and warmer in summer, and colder in winter, from the quantity of ice there is in winter in the rivers and bay. If they had fixed them higher up in the country, where the thaw begins much sooner than at the Bay, they would have had a happier situation, and a quite different climate and soil. How can it be expected that anything can thrive in their garden, or be brought to perfection? when the floods in the latter end of April leave flakes of ice several feet thick in their gardens, which are not dissolved until the latter end of May; and yet after that time, when they dig their gardens, they have very good coleworts and turnips, green pease and beans, when if they had been situated higher up in the country from the Bay, they might have had all sorts of fruit, grain and roots in perfection, and tame cattle and fowl for their use; at present the Company's servants depend upon the fish and wild geese they take for their winter store. They have pike, trout, perch and white trout in great perfection in all their rivers; but the principal fish they take is a little larger than a mackarel, of which 13 or 14,000 are taken at Albany in a season, which supplies them and their Indian friends in winter; these they take after the rivers are frozen over, keeping holes open in the ice, in a straight line at proper distances, through which they thrust their nets with poles, and the fish coming there to breathe are mask'd or entangled in the net; these they freeze up for winter without salt. The wild geese come to these rivers from the southward in the middle of April as soon as the swamps are thawed, at which time they are lean; they stay until the middle of May, when they go northward to breed; they take at Albany in that season about 1300 for present use; they return again with their young about the middle of August and stay until the middle of October, when they go farther southward; they save generally about



3000 of these, which they salt before the frost begins, and what they take afterwards they hang up in their feathers to freeze for winter store, without salt, the natives shoot them in the swamps. There are three kinds, one a grey goose, which without giblets weighs from 6 to 10 pounds; another which they call Whaweys, are from 4 to 6 pounds; they have also swans, grey plover exceedingly fat, white partridges as big as capons, in abundance all winter and spring, which feed upon the buds of spruce, birch and poplars. The New Severn River which the French call St. Huiles is in Lat. 56 deg. this the Company neglects, to avoid expense, tho' it be a very fine river, well wooded, capable of receiving ships of 50 or 60 tons Burthen and full of Beavers and other wild beasts of rich furs; for they being too far off the French, they oblige them to come to Albany or York Fort with their furs. The river Bourbon or Nelson, upon whose south eastern branch is York Fort in Hay's Island in Lat. 57 degrees is one of the noblest rivers in America, and by much the finest and largest in the Bay; and tho' the names given to the several lakes and rivers which enter into these lakes, which are upon it, betwixt its source on the south west side of the upper Lake and York Fort are different according to the accounts given by Jeremie De la Poterie and Joseph La France, yet they all agree in this, that there are a great number of very large lakes upon it, at great distances within land, southwesterly and westerly from the Bay, in fine climates and fruitful countries among many populous, erratic nations, such as Assinibouels, Christinaux, Savanna, Monsoni, Vieux Hommes, Tete Plat, Panis Blanc, Sturgeon Indians, etc., which abound with all sorts of excellent fish, and are navigable for many hundred leagues, tho' the rivers which fall into them have several sharps and Falls, which occasions several Land Carriages, yet canoes pass and repass all these lakes and rivers from its source to York Fort, the natives coming down for about a thousand miles to trade there. The climate at York Fort, tho' in Lat. 57 degrees seems not to be colder than at Albany in 52 degrees since, if the account taken from Button be true, the ice broke up there in that river on the 26th April, and the river, tho' not above a mile broad, was not that year frozen over the 16th of February, when at Albany it was frozen over in the beginning of November, and it did not break up at the Factory until the beginning of May; this might probably be occasioned by the strength of the tide at Port Nelson, which rose sometimes 14 feet, when at Albany it does not rise 4 feet, and the waters of Nelson river run from the southward, from more immediately warm climates, when that at Albany comes from the W.S.W. and all the bottom of the Bay being full of ice, makes the cold more intense and continue longer at the mouth of that river."

"This seems confirmed from La France's account, that within four or five leagues of the sea at York Fort, the cold continued, and there was ice in the river in June, when above that they had a fine spring, all the trees in



bloom, and very warm weather up to the great fork in the beginning of June, and in the river from thence to Pachegoia, or the lake of Forests, there was a fine spring and bloom from the beginning of May, all the lands about that lake, and to the southwards, being free from ice and snow, in the beginning of April, N.S. so that here is an excellent soil and climate upon this river, a few days sailing up the river, even below the great fork, which is but 60 leagues to the southward, and the river navigable so far with large shallops and boats."

"This river opens a trade into a country of surprising greatness through the lakes Pachegoia, Coriboux, Siens, Great and Little, Ouinipique, the lakes Du Bois, De Pluis, and Red Lake, according to La France, and the rivers Vieux Hommes and others which enter these several lakes; or by the lake of Forests, the Great Water, the Junction of the two seas, Tacamiouan and others, according to Jeremie, abounding with all kinds of game, fish and beasts of rich furs, in excellent climates abounding with Timber Trees of all sorts and wild fruit and capable of all other kinds of fruit and grain upon cultivation. What an immense trade might be begun and improved through these countries? For the natives being numerous, and of a humane disposition, upon having an equitable commerce with us would soon be civilized and become industrious. In such rich and delightful climates what a vent might be had there for our woollen and iron manufactures, as well as for others, may be easily conceived."

"At present the Company have a little wooden fort upon Hay's Island much decayed, in which they keep 25 servants to manage their trade, from whence they return annually about 50,000 Beavers skins, or other furs to that value, under all the disadvantages the Indians trade with them at present."

"Northwards from this in Lat. 59 degrees is Churchill River, where the climate at some distance from the Bay is not worse than at Stockholm or Petersburg. The river is navigable for 150 leagues and again, after passing some mountains, is navigable far to the westward, to a country abounding in copper. This communicates with the river of Stags, which falls into the great lakes upon Nelson River, insomuch that the southwestern and western part of the Bay, without including the southern or eastern sides, would in some years, if settled and improved by civilizing the natives afford an inexhaustible fund for trade."

"The present situation of the Prince of Wales's Fort on Churchill River, is vastly cold, and for that reason very inconvenient, as are all the other Factories on the Bay, all the others being fixed with a view only to profit, and this alone for profit and strength, without any view to other conveniences, and therefore they have fixed it upon an eminence 40 feet high, surrounded on all sides, without any shelter, by a frozen sea and river, and plains of snow, exposed to all storms, which causes its being colder than in proper situations



within the Polar Circle, being vastly colder than a few leagues up the river among the woods, where the factory's men lived comfortably in huts or tents all the winter without any complaint of cold or sickness, hunting, shooting and fishing the whole season."

#### CAPTAIN COAT'S OPINION OF DOBBS.

From the Journals of Capt. W. Coats, (edited by Barrow and published by the Hakluyt Society, London, 1852) who made many voyages to the Hudson Bay between 1727 and 1751 is extracted verbatim et literatim the following testimonial to the reliability of Arthur Dobbs:

"In his description, the interior parts of that wide extended country were, as he tells us, collected from a refugee, a runnagade, an illiterate, and an entire stranger to all, or most of the bordering countrys uppon Hudson's Bay, a French Indian; and as such never did, nor dare any of those rambles beyond the borders of the superior lake, nor trust themselves among the hygher tribes of Indians, but was born and bred in the mungril tribes near the inferior lakes on the skirts and borders of Canada, a very Indian without letters, without experience and without capacity. . . . All the monstrous fables of antiquity can hardly parrelel his absurdities."

As to his own account Capt. Coats says it is "collected from such persons as none that knew them would dispute their candour and capacity." He then gives minute sailing directions for entering the shoals and Bay.

He describes Churchill as follows:—

"Churchill River, in latitude 59 deg.00'N., and 95 deg.00' west longitude from London (in Indian, Manato-e-sepe, a sea like river), has an entrance from ten to seven fathom water deep, and steep on both sides, but rocky, and a most violent tide of ebb, which is owing to the form of that river, which expands itself from an entrance of about a third of a mile from Cape Mary to Usquemow Point; within from Buttons' rock to the opposite shore, is five mile over. Uppon Usquemow Point the Company have erected a stone fort of a quadrangular figure, which is sufficient to defend the enterence into this river. Three miles up you have water for any ship, but higher up 'tis full of sholds and flatts, and very stoney. Above Musketa Point is a fall of water, which terminates the navigation of this river to any other than very small boats and canoes."

"York Fort, in Hay's River, has the most principle trade in that country, where the two rivers brings down such swarms of natives annually, as is nowhere else in that country."

"Port Nelson is by much the most navigable for ships and near half the trade come down that river; but 'tis so full of sharps and falls, that most of our Indians chuse Hay's River and 'tis more secure, and better for the Com-



pany, guarded by those flats and shallows against the attempts of an enemy by sea, the only way to come at this settlement."

"As to the extent of these two rivers, they run up seventy miles nearly parallel to one another, between the south and west, and there unite, forming that island the settlement is made upon; from thence it runs into some morass and beaver grounds, and has its source in the infinity of little lakes, which dilate themselves in rivulets into the Lake Nimipigon."

"From the mouth of Port Nelson to Cape Tatnam is near twenty leagues distance E.N.E. by true chart, along a flat shore, from five to ten fathom deep, in a channile about six leagues broad, over to Nelson shoals."

"The Cape is flat off a great way, to 57 degrees, 35 minutes variation, 17 degrees N. Westerly, in the 1740, where the coast winds away E.S.E.; but flat and sandy, and the coast very low but woody; twelve miles along shore you meet the east and west Pens, two little woody islands."

"And in latitude 56 deg.00' is a fine river, caled Severn, which dilates itself into far distant countrys, communicates with all those lakes, and affords, by its branches, an easy enterence into all the other rivers; hence the Indians go indifferently to Albany, to Hayes, and Port Nelson."

"About forty years ago, the Company had a settlement on this river, and the trade was considerable; but upon the recovery of York Fort by the peace of Utrecht, the Company throwed it up as not worth the expence and the trade is divided between Albany and that place."

"The mouth of this river is said to be shoal; but the bar is not near so broad as at Hay's River."

"This coast and river is cover'd with wood every where and a pritty clean shore without ten or twelve fathom."

## YORK FACTORY.

(*McLean's Hudson Bay*, Vol. 2, p. 17.)

The site of the factory is swampy. The anchorage is very much exposed. Mr. McLean mentions a case in which the annual vessel from England had just dropped anchor in her usual mooring ground, when a storm came on which compelled her to loose her anchors and bear away back to England.

"The climate, although extremely disagreeable, is not considered unhealthy. In summer the extremes of heat and cold are experienced in the course of a few hours; in the morning you may be wearing nankeen, and before noon, duffle. Were the heat to continue for a sufficient length of time to thaw the ground thoroughly, the establishment could not be kept up save at a great sacrifice of life, through the mephitic exhalations from the surrounding swamps. The ground, however, seldom thaws more than eighteen inches, and the climate therefore is never affected by them to such a degree as to become unhealthy."



The country was once periodically visited by immense herds of reindeer (caribou), but at present (1833) Mr. McLean says there is scarcely one to be found.

Leaving York Factory on August 22nd on a brig, the vessel a short distance out from the factory was beset with such quantities of ice that the course had to be changed for the north two or three hundred miles before they could resume the proper course.

### CHURCHILL HARBOUR.

Accompanying the report of Lieut. Gordon's Hudson Bay Expedition of 1886 (Can. Sess. papers 1887, No. 15) are a plan of Churchill Harbour at the mouth of Churchill River and chart of the York roads at the mouth of the Hayes and Nelson Rivers. He describes the Churchill Harbour as follows:—

*(Can. Sess. Papers, 1887, No. 15, p. 8.)*

“The harbour at Churchill is formed by the mouth of the Churchill river, which empties itself into Hudson Bay at that angle in the coast lying between Cape Churchill and Seal River. Between these points the older rock formations come right down to the sea. At its mouth the Churchill river flows nearly north (true.) The estuary itself is narrow, being only about 600 yards in width. At this point the tide runs with very considerable velocity, estimated at half tide to run about six knots. The basin for anchorage, with a depth of over four fathoms at low water, is about 1,500 yards north and south, by about 1,000 yards east and west; at two points, leads of from 100 to 200 yards in width carry this depth up for a considerable distance further, and it is in the eastern one of these that I have always anchored. The holding ground is excellent, the bottom being mud, and though the tide runs very rapidly this harbour is an eminently safe one.”

“The approaches to Churchill are well marked, and in clear weather the land stands out bold and high, being easily identified at a distance of from ten to twelve miles. In thick weather the rule for making this harbour is to steer in W. by S. keeping in twenty fathoms of water.”

“If shoaler water than this is met with haul up to the north at once, till the water deepens to 20 again. At first the bottom is hard, limestone, coral and gravel. Keep on this W. by S. course till the lead shows soft mud, when you are in the lead of the river; then alter course to S.  $\frac{1}{2}$  W., which will bring you right down on Mosquito Point. Keep the lead going, and do not shoal the water to less than ten fathoms. The soft bottom in the lead of the river can be readily distinguished even at a distance of eight miles from its mouth, and there is no danger in approaching to this distance when the above rules are observed.”



"This harbour is admirably suited for a railroad terminus."

"The necessary docks could be easily and cheaply built, and the deep water basin enlarged at small cost. Stone is lying at the water's edge ready to be laid into docks and piers, and nature seems to have left little to be done in order to make this a capacious port, fit for doing a business of great magnitude."

#### YORK ROADSTEAD.

Lieut. Gordon gives this description of anchorage grounds at York.

"Port Nelson was so named after the master of one of his ships who died during the winter."

"The fact of the name being thus entered on the chart may have led people to believe that some harbour existed at this point."

"The Nelson and Hayes rivers here empty their waters into Hudson's Bay, and on the tongue of land lying between the mouths of these rivers is built York Factory, the great entrepôt in years gone by of the Hudson Bay company. The site was selected by the company, not on account of the existence of any harbour for the security of their shipping, but because the Hayes river was the best boat and canoe route to and from the interior."

"Formerly this route was the great, if not the only, means of communication with the early settlers of the Red River and Selkirk Settlements, and it at one time required two ships of considerable size to carry out the goods, not only for the company's trade, but for the use of the settlers. At that time the company's ship did not come into the port, but the freight was discharged in the outer roads into schooners, which the company kept in the bay; these took the freight up the river to the factory, taking out the return cargo in the same way. Of late years, other means of communication with the Northwest Territories having been established, the freight requirements of the Company's trade at this post have been much decreased, and for several years past a small brigantine, drawing from 9 to 11 feet of water, has done all the work for the York and Churchill district, and this small vessel has frequently taken the ground both going in and coming out."

"The outer anchorage in the lead of the Nelson River is ten miles from the nearest land, which is so low as to be out of sight from the deck. The tidal currents at this point run from two to two and a half or even three knots per hour, the direction varying with the time of the tide. The only distinguishable object is the Point Marsh Beacon, which towers up 80 feet above high water, and without which it would be almost impossible to make the anchorage even in clear weather. In thick weather a ship must keep right out in thirty fathoms of water, or she may find herself carried in by the tide, when she cannot get out again. A shoal (Point Marsh Shoal) extends out for over eight miles, and has less than six feet of water on it; and when it is borne in mind that the surrounding land is uniformly low and level, with



no natural features which could be used as leading marks, some idea of the difficulty of taking a ship into this place may be realized. It is undoubtedly true that a channel does exist in the lead of the Nelson river, but it is both narrow and somewhat tortuous, and would have to be closely buoyed throughout its entire length from the anchorage to Seal Island, a distance of about twenty-seven nautical miles."

"The Indians say that the channel shifts from year to year, and I have no doubt their statement is correct. The mouth of the river from Sam's creek to Point Marsh Beacon is ten miles across, and the channel at this point less than a mile in width. It narrows opposite Black Bear creek to about 2,000 feet, and two miles east of Flamborough Head, where the river is still between two and three miles wide, the channel has narrowed to two hundred feet. In order to make a channel and basin capable of accommodating freight carrying vessels much dredging would have to be done, and besides the 27 miles of closely buoyed channel, a lightship would have to be moored some distance from the outer anchorage to enable ships to come in if the weather was partially clear."

"A great deal of fog hangs over the bay in the months of July and August, and much delay, if not disaster, would be sure to occur if vessels were to attempt to make this port in anything but the finest clear weather, and as we met a lot of loose ice, which was very heavy, off the mouth of the river on the 5th of August, the lightship could not be placed in position till all danger from this cause was gone."

"The cost of construction and maintenance of a harbour at this place together with the inevitable risks of navigation in approaching it, even after all had been done that could possibly be done, to render it safe and accessible, would, in my opinion, far outweigh the construction of the necessary additional mileage of railway required to reach the port of Churchill."

"The channel which I have been considering is one of 18 feet at low water, which as the rise and fall averages 12 feet, would permit the passage of a 2,000 ton steamer, drawing 19 to 20 feet at half tide, as the distance from the anchorage to the proposed port is so great that a vessel could not afford to wait and go in at the top of high water."

"I consider that the estuary of the Nelson river is one of the most dangerous places in the world for shipping to go to. At the outer anchorage the sea in a northeast gale breaks from the bottom, and the captains of the Hudson's Bay ships, if the barometer is falling and the weather threatening, will go to sea in the afternoon and lie off till the weather clears again."

"The 'Alert' lay in five fathoms at low water with 35 fathoms of chain out, but steam was ready for instant use the whole time and the cable buoyed and ready for slipping. One night during an easterly gale which she rode out at her anchors, Capt. Barrie, my first officer, who was in command at the time, reports, that had it not been for the ship being fitted with tanks and



tubes for running oil he would have been compelled to slip and go to sea. The tide carried the oil to windward and kept the sea from breaking over the ship, though she was straining heavily at her chains and rolling the boats to the water all through the night."

"I can only now repeat my previously expressed opinion, that the Nelson river is no port, nor would the expenditure of any amount of money make it a desirable place for shipping.

### MOOSE FACTORY HARBOUR INFERIOR EVEN TO YORK.

In 1891 Mr. James Johnson, Dominion Commissioner of Customs, visited Hudson Bay with a view to getting information about the extent of the illegal trading alleged to be carried on there by foreigners with the natives. In the Report of the Minister of Marine and Fisheries for that year, Mr. Johnson is represented as being of opinion that Hudson Straits are navigable for specially constructed vessels during four months of the year and possibly longer. The Bay is open for six months or even longer. The best harbour to be found on the western coast is Churchill at the mouth of the Churchill River. This harbor affords good protection and safe anchorage with a depth of over five fathoms at low water. York Factory, also, on the west side but south of Churchill is not a good harbour for vessels of any size; much difficulty has always been met with in landing goods carried by vessels of sufficient size to be employed in the trade from Atlantic ports. The harbour at Moose Factory is not even as good as that at York Factory but the two latter places are favorable distributing points for the Hudson Bay Company.

### THE SEASONS ACCORDING TO H. B. CO.

In 1884 the Dominion House of Commons appointed a Select Committee to enquire into the navigation of the Hudson Bay. The report of the Committee was to the effect that there was always a navigation season of three or four months. "For more than 250 years sailors have counted upon having an uninterrupted navigation of from  $2\frac{1}{2}$  to 3 months and this without marine charts, without an accurate knowledge of the waters, without lighthouses, without a system of telegraphic communication and without the aid of steam." The Committee recommend the establishment of observatories on the Straits as well as on the shores of the bay.

As to the seasons the Committee reports:—

*(Can. Journals, 1884, app. 2.)*

"The breaking up of the rivers which fall into Hudson Bay, as well as the date of the formation of the ice upon these rivers and upon the beach of the bay, are of course the important facts, which it is necessary to take into account in order to determine the duration of navigation. From the tables



given to the Government by the Hudson Bay Company (in 1880) it appears that the breaking up of the Hayes river at York Factory (for a period of 53 years) took place on the average on the 15th May; the mean of the formation of ice gives the 20th of November which would give an average of five months or thereabouts of navigation. We know that the 1st of May is the usual date of the opening of Montreal harbour, and the 25th of November that of its closing."

### CLIMATE AND CHARACTERISTICS.

Mr. Robert Bell, now Acting Director of the Geological Survey of Canada, gave evidence before the Committee. He thought the country presented no formidable obstacles to the construction of a railway between Winnipeg and Hudson Bay. Of the land he said:—

(p. 3, 1884.)

"There is very little soil about Fort Churchill, but there is land on the Nelson river near to Hudson's Bay. It cannot, however, be said to be a farming country owing to the unfavorable influence of the immediate vicinity of the sea in such a northern latitude. It is not from the extreme cold of the sea, but from the continued coldness and want of high temperature, necessary to bring crops to maturity which require a temperature of certain intensity during one period of their growth, and which they cannot get owing to the proximity of the sea. On the other hand during the winter this sea has a modifying influence which is quite favorable, preventing extreme cold in winter."

### NELSON RIVER NO PORT.

As to the Nelson River, Mr. Bell said:—"There is no such port as Port Nelson. Off the mouth of the river there is an open roadstead in which ships anchor, probably 20 or 30 miles from the shore, and from this a shoaling channel might be followed up into the Nelson river, becoming narrower to the head of tide water, where the depth was only 10 feet. The river has a bar with a depth of 10 feet on it, the inland channel of the river being 20 feet for 50 or 60 miles beyond. At the head of tide the river is rather less than a mile wide and 50 miles up is about half a mile. The velocity of the current at this point is from  $2\frac{1}{2}$  to 3 miles."

There are good deep water harbours on the east shore of Hudson's Bay.

### CHURCHILL RIVER.

Churchill, Mr. Bell described as being situated as nearly as possible midway between the Atlantic and Pacific coasts of this continent, rather nearer indeed to the Pacific than to the general outline of the Atlantic



coast. It is distant from Liverpool 2,926 miles or 64 miles less than the distance from Montreal to Liverpool and 114 miles nearer than New York is to Liverpool.

### NO ICEBERGS IN HUDSON BAY.

There are no icebergs in Hudson Bay. From the nature of the shores there could be none; there is merely thin ice which forms along the shores and floats off in spring as the ice does in lakes. Floating ice might jam in James Bay after long continued northern winds. A steamer would have no difficulty in forcing its way through this ice, which is thinner than that found between Halifax and Newfoundland.

Up to 1882, 730 round voyages had been made into Hudson Bay and recorded by the Company, with very few disasters.

### NOT PERPETUALLY FROZEN GROUND.

Mr. Bell said the frost did not remain permanently in the ground in all parts of the shores of Hudson Bay. "In the northern parts if any soil exists at all it might be frozen permanently but in some places where the frost is reported to be permanent I doubt very much if it is so. At York Factory a smooth sharpened pole was driven into the ground in many places to a depth of about six feet without finding frost and the small streams run throughout the winter there, showing that the ground had not frozen, and the water runs out on the banks from under the snow into the rivers. Travellers observe that the banks are frozen sometimes to the depth of 40 feet or more, and jump to the conclusion that this represents a permanent frost whereas it is merely a frozen layer lying against the face of the bank. Sir Henry Lefroy has mentioned circumstances in his travels as seeming to show that the ground was frozen to such great depths, but he has since admitted that probably my explanation was correct, since the radiation of the earth's heat was in two directions in such situations. We find in the latitude of Ottawa city, the ground frozen under similar circumstances. I have seen on the banks of the St. Francis River, Province of Quebec, in digging a hole for a post for a ferry, that there was frost in the ground at a depth of some five feet down. At the mouth of the Nepigon river, in the summer, under exactly similar circumstances, I have also found the same phenomenon in digging a hole, also for a post, in the bank of the river."

### FISHERIES OF HUDSON BAY.

Mr. Bell said about the fisheries: "Judging from the latitudes covered by Hudson's Bay, it should be extremely favorable for fish. The water is moderately cold, and the latitude of the Bay is the same as the British Islands and the fishing grounds of Labrador. The sea bottom being favorable for an abundance of food for fishes, we should naturally expect to find haddock and



codfish. The rock-cod which is found there may be a variety of the common cod, but it is inferior. There is evidence that the ordinary variety of cod is found there; for example, Hearne speaks of having seen the remains of codfish at Churchill. The bishop of Moosonee told me that while he was at Little Whale River, it was reported that the real codfish had been caught there, and the captain of the ship that I came out with said that he had seen dead haddock floating in Hudson's Strait. According to Richardson, cod are found near Cumberland Inlet, north of Hudson's Strait. The finest fishes of Hudson Bay that we actually know of are salmon, speckled trout, sea trout, the grayling and white fish."

"There are three kinds of salmon found in the Bay; only one, namely, Hearne's salmon, is found on the east side. The same is also found at Churchill, and northward on the west side. Further north, the Arctic salmon is said to exist, while the common salmon is abundant on both sides of the Hudson's Strait. The Esquimaux have caught them in large numbers."

"The Hudson's Bay Company salt them at Fort Chimo, and during the last three years they have been sending them home fresh to the London market. During the last three years cargoes of frozen salmon have been sent by a little steamer called "The Diana," and when they arrive in London are pronounced in perfect condition, and very fine fish indeed. Some have been sent, still frozen, as far as Australia. The whitefish seems to be a very superior fish, and the grayling is found in the streams of the northern part of the west side of the Bay. Whales have not disappeared from the north-west portion of the Bay. Of course the whale is a long-lived and intelligent animal, and if they find themselves hunted, they naturally forsake the grounds. The white porpoise, although not very large, yields the best of oil—yielding as much as a barrel of oil to each one; and one year they got as many as 2,800 of these porpoises at one place."

#### BORRON ON THE CLAY LAND.

The following description by Borron of the Clays on the south side of the Albany River, Ontario's present boundary, will probably apply to those on the north side of the river:—

*(Borron's Report, Ont. Sess. Papers, 1890, No. 87, p. 22.)*

"Underlying the peat, clay is almost invariably found wherever the bottom can be reached."

"This clay, as seen on the points of poles thrust down into it, is a bluish-gray color. As seen in the banks of the ravines and rivers it is a light gray, sometimes a drab color. The latter is more common in the second belt or zone above the long portages, and with stones of older rocks generally contains fragments of fossiliferous limestone from the Devonian beds to the



north. The other clay also frequently contains boulders and stones of Laurentian, Huronian and trap rocks. Both are calcareous, and therefore what may be called marls."

"Below these in the lower or coast belt or zone of this territory a tough blue or slate colored clay is sometimes met with. It often contains marine shells, but very few stones or boulders."

"Lime enters so largely into its composition, that if only sufficiently indurated, it might be fairly classed as limestone."

"Sand in the form of mounds and ridges is also occasionally met with, but more generally it appears in a layer or stratum of no great thickness in the banks of the rivers, resting on the clays."

"The underlying rock in the lower belt is rarely seen, but where exposed is generally found to be Devonian limestone."

"No hills whatever occur in this lower belt, and the timber is confined to narrow strips along the water-courses, and to islands in the larger rivers."

#### THE LEVEL CLAY COUNTRY.

*Russell, p. 10.*

Alex. J. Russell, C.E., Inspector of Crown Lumber Agencies, under the old Province of Canada, in his book "The Red River Country, Hudson's Bay and Northwest Territories considered in relation to Canada," describes *inter alia* the country north of Lake Temiscaming, called by the Hudson's Bay people "The Level Clay Country." "The boundary of this silurian plain country is probably quite irregular, and may in many parts not be accurately known. Mr. Ballantyne, who resided there, places it about Martin's Falls, on the Albany River, 250 mile due west of James' Bay; and says the river flows through a limestone and clay country to the Bay. Lieut. Blakiston, in ascending Hayes River from York Factory, described the country on it is alluvial, without any rock being visible, for a hundred and twenty-four miles, to the first portage, where he says the primitive formation commences, and that is 200 miles due west from the coast of the Bay."

#### CLIMATE OF FORT CHURCHILL AND YORK FACTORY.

*Russell page 12.*

"The north-east part of the Hudson Bay Territory is extremely cold. The barren ground of the north where trees of every kind almost entirely cease to exist, sweeps down into the north-eastern part of it, as much as a hundred and fifty miles southward of the sixtieth parallel of latitude, closely approaching Churchill River towards its mouth. Even at York Factory, nothing but the hardiest vegetables can be raised. In summer there is a thickness of seven feet of perpetually frozen ground, at ten feet below the surface, and spruce trees, the prevailing wood, are almost uselessly small."



"But the climate improves equally southward and westward, the western side of it even to its north-west angle, is wooded thickly and flanks the great central region suitable for cultivation."

"Umfraville, writing in 1790, says that the pine trees (spruce probably) on the coast of Hudson Bay, near York Fort, are "too small and knotty to be used for good building; but on leaving the marshy country and going inland to the southward, trees are of a more stately growth; and about Albany and Moose Forts they are found of all diameters;" and adds further that "potatoes, turnips and almost all kitchen garden stuff are raised with facility and no doubt corn could be raised," but the company, he says, discourage anything like cultivation."

### VALUE OF SOUTHERN HUDSON BAY TERRITORY.

*Russell, p. 155.*

After setting forth the great value to Canada possessed by what is now the Province of Manitoba and the Northwest Territories, Mr. Russell goes on :

"The next in value to us, though very much inferior to the preceding, is that here described as the south Hudson's Bay Territory, or that part of it, at least, up to the line of latitude 52 degrees, 30 min. N from a little above the mouth of the Albany River, on Hudson's Bay, across to Lake Winnipeg. It is a habitable country, with much fertile arable land, admitting of the cultivation of coarse grains in the north, and, as we have seen, is as suitable, in some of the south parts of it, for the growth of wheat, as Lower Canada. We require it in connection with the preceding, because the southern part of it, contains the best lines of communication with Red River, and which being chiefly by water, are the most advantageous for the heavy freight of the interior, and also because through it we can have a most direct and favorable line of railroad to Red River and the Pacific."

### CLIMATE OF YORK FACTORY.

Mr. R. M. Ballantyne in after life, a well-known writer of books for boys, was in his youth a servant of the Hudson Bay Company. Several of his books relate to the time of his service with the Company; notably, "Hudson Bay, or Every Day Life in the Wilds of North America." Chapter five of this book gives an account of a journey from York Factory to Norway House. It describes, however, the incidents of the trip rather than the country passed through and is not considered worth quoting here. Chapter 8 gives an account of life at York Factory from which the following notes are taken :

*(Ballantyne, Hudson's Bay. pp. 168-173.)*

"The climate of York Factory is very bad in the warm months of the year, but during the winter the intensity of the cold renders it healthy. Summer is very short, and the whole three seasons of spring, summer and autumn



are included in the months of June, July, August and September, the rest being winter. During part of the summer the heat is extreme and millions of flies, mosquitoes, etc., render the country unbearable."

"Fortunately, however, the cold soon extirpates them. Scarcely anything in the way of vegetables can be raised in the small plot of ground called by courtesy a garden. Potatoes one year, for a wonder, attained the size of walnuts, and sometimes a cabbage and a turnip are prevailed upon to grow."

"Yet the woods are filled with a great variety of wild berries, among which the cranberry and the swamp berry are considered the best. Black and red currants, as well as gooseberries are plentiful, but the first are bitter, and the last small. The swamp berry is in shape something like the raspberry, of a light yellow colour and grows on a low bush almost close to the ground."

"They make excellent preserves, and together with cranberries, are made into tarts for the mess during winter."

"In the month of September there are generally a couple of weeks or so of excellent fine weather, which is called the Indian summer; after which, winter, with frost, cold and snow sets in with rapidity. For a few weeks in October there is sometimes a little warm weather (or rather I should say a little thawy weather); but after that until the following April, the thermometer seldom rises to the freezing point. In the depth of winter it falls from 30 to 40, 45 and even 50 degrees below zero of Fahrenheit. This intense cold, however, is not so much felt as one might suppose as during its continuance the air is perfectly calm. Were the slightest breath of wind to arise when the thermometer stands so low, no man could show his face to it for a moment. Forty degrees below zero, and quite calm, is infinitely preferable to fifteen degrees below, or thereabouts, with a strong breeze of wind."

"Spirit of wine is, of course, the only liquid that can be used in the thermometer, as mercury, were it exposed to such cold, would remain frozen nearly half the winter. Spirit never froze in any cold ever experienced at York Factory, unless when very much adulterated with water; and even then the spirit would remain liquid in the centre of the mass. To resist this intense cold the inhabitants dress not in furs, as is generally supposed, but in coats and trousers made of smoked deer skins; the only piece of fur in their costume being the cap. The houses are built of wood, with double windows and doors. "They are heated by means of large iron stoves fed with wood, yet so intense is the cold, that I have seen the stove in places red hot and a basin of water in the room frozen nearly solid. The average cold, I should think, is about 15 or 16 degrees below zero, or 48 degrees of frost."

"The country around is a complete swamp, but the extreme shortness of the warm weather, and the consequent length of winter, fortunately prevents the rapid decomposition of vegetable matter. Another cause of the unhealthiness of the climate during summer is the prevalence of dense fogs, which



come off the Bay and enshroud the country; and also the liability of the weather to sudden and extreme changes. Summer may be said to commence in July, the preceding month being a fight between summer and winter, which cannot claim the slightest title to the name of spring. As August advances the heat becomes great; but about the commencement of September nature wears a more pleasing aspect, which lasts till the middle of October. It is then clear and beautiful, just cold enough to kill all the mosquitoes, and render brisk exercise agreeable. About this time, too, the young ducks begin to fly south, affording excellent sport among the marshes. A week or so after this winter commences, with light falls of snow occasionally, and hard frost during the night. Flocks of snow birds (the harbingers of cold in autumn and heat in spring) begin to appear and soon the whirring wings of the white partridge may be heard among the snow-encompassed willows. The first thaw generally takes place in April, and May is characterized by melting snow, disruption of ice, and the arrival of the first flocks of wild fowl."

"The country around the fort is one immense level swamp, thickly covered with willows, and dotted here and there with a few clumps of pine trees. The only large timber in the vicinity grows on the banks of Hayes and Nelson rivers, and consists chiefly of spruce fir. The swamp nature of the ground has rendered it necessary to raise the houses in the fort several feet in the air upon blocks of wood; and the squares are intersected by elevated wooden platforms, which form the only promenade the inhabitants have during the summer, as no one can venture fifty yards beyond the gates without wetting his feet. Nothing bearing the most distant resemblance to a hillock exists in the land. Nelson river is a broad stream, which discharges itself into Hudson Bay, near the mouth of Hayes River, between which lies a belt of swamp and willows known by the name of the Point of Marsh. Here may be found during the spring and autumn, millions of ducks, geese and plover, and during the summer billions of mosquitoes. There are a great many strange plants and shrubs in this marsh, which forms a wide field of research and pleasure to the botanist and the sportsman; but the lover of beautiful scenery and the florist will find little to please the eye or imagination, as nature has here put on her plainest garb, and flowers there are none."

"Of the feathered tribes there are the large and small gray Canada goose, the laughing goose (so called from the resemblance of its cry to laughter), and the wavy or white goose. The latter are not very numerous. There are great numbers of wild ducks, pintails, widgeons, divers, saw bills, black ducks and teal; but the prince of ducks (the canvass-back) is not there. In spring and autumn the whole country becomes musical with the wild cries and shrill whistle of immense hosts of plover of all kinds, long legs, short legs, black legs and yellow legs—sandpipers and snipe, which are assisted in



their noisy concerts of myriads of frogs. The latter are really the best songsters in Hudson Bay. Bitterns are also found in the marshes; and sometimes, though rarely, a solitary crane finds its way to the coast. In the woods, and among the dry places around, there are a few grey grouse and wood partridges, a great many hawks and owls of all sizes, from the gigantic white owl, which measures five feet across the back and wings, to the small gray owl, not much bigger than a man's hand."

"In winter the woods and frozen swamps are filled with ptarmigan,—or, as they are called by the trappers, white partridges. They are not very palatable; but, nevertheless, they form a pretty constant dish at the winter mess table of York Factory, and afford excellent sport to the inhabitants. There are also great varieties of small birds, among which the most interesting are the snow birds, or snow flakes, which pay the country a flying visit at the commencement and termination of winter."

"Such is York Fort, the great depot and gate to the wild regions surrounding Hudson Bay."

#### WEATHER OBSERVATIONS AT YORK FACTORY.

From notes by observers in Can. Sess. paper No. 15, 1887.

|                             | Last Snow.          | First Snow |
|-----------------------------|---------------------|------------|
| 1846 River broke up, May 5. |                     | Sept 18.   |
| 1847.....                   | June 12.....        | Sept. 2    |
| 1848.....                   | June 22.....        | Sept. 8    |
| 1849.....                   | June 4.....         | Sept. 27   |
| 1842.....                   | .....               | Sept. 20   |
| 1843.....                   | June 14.....        | Sept. 17   |
| 1844.....                   | June 9, July 2..... | Sept. 19   |
| 1845.....                   | June 14.....        | Aug. 31    |
| 1850.....                   | May 27.....         | Sept. 26   |
| 1851.....                   | June 9.....         | Oct. 14    |
| 1852.....                   | June 7.....         | Sept. 12   |
| 1853.....                   | June 22.....        | Sept. 12   |
| 1854.....                   | May 20.             |            |

The average temperatures, 8 years ending 1883 at York Factory were :

|                |        |
|----------------|--------|
| January.....   | —20.74 |
| February.....  | —14.26 |
| March.....     | — 6.48 |
| April.....     | 19.36  |
| May.....       | 35.86  |
| June.....      | 53.64  |
| July.....      | 63.30  |
| August.....    | 53.91  |
| September..... | 42.33  |
| October.....   | 27.60  |
| November.....  | 7.46   |
| December.....  | —12.23 |



Average temperature for the year 1885-6:

|                    |       |
|--------------------|-------|
| York Factory ..... | 20.00 |
| Port Arthur .....  | 35.00 |
| Ottawa.....        | 40.00 |
| Toronto .....      | 45.00 |

#### MR GLADMAN ON ALBANY AND YORK FACTORY.

Mr. Gladman, a native of Hudson Bay Territory, born at New Brunswick, a station on the Moose River, about half way between James Bay and Lake Superior, gave evidence before the Select Committee of the British House of Commons in 1857. Of the Albany River and York Factory he said:

*(Gladman, p. 391, British H. of C. Committee, 1857.)*

“Have been also at Albany but did not winter; climate and soil do not differ much from Moose, being little more than 100 miles further north; well sheltered also, and the extensive marshes on the coast furnish an abundant stock of fodder for domestic cattle. The Albany river is considered one of the best routes of communication between Hudson’s Bay and the Red River settlement; boats were used for conveying goods to the interior country long before the junction of the Hudson’s Bay and North-West Companies, in 1821. The most western post of the Albany district of ancient days was Brandon House on the River Assiniboine; the soil around the posts of Henley, Martin’s Falls, Osnaburg and Lac Seul, is of a quality that enables the servants of the company to raise fair crops of potatoes; in point of latitude these posts are very little north of Red River.”

“Was in England in 1834-35 and on my return to Canada was ordered into the northern department of the Company’s trading territories. Cumberland House being appointed as my wintering station in 1835; excellent wheat grown at Cumberland, which was ground by us with a steel hand-mill; made flour of first quality; other vegetable produce raised there with complete success; soil chiefly on limestone, and the climate favorable for garden stuffs of every sort; the Company’s horses were not housed at all during the winter, and thrive very well in the reedy swamps near to the station, this is considered, in fact, one of the choice posts of the northern country.”

“Was stationed at York Factory from 1836 to 1841; the soil around not adapted to cultivation, being for the most part mossy swamps; saw a crop of turnips raised there in a small garden only once, failed in other years from frequent blights and night frosts during the summer months; the ice remains on the coast through July; pits were dug there with a view of ascertaining the depth of ground thawed during summer; repeated digging showed only about three feet of thawed ground, whilst the perpetually frozen ground was found to be about fifteen feet. This depot is the most important post of the Company on Hudson’s Bay, being the centre of imports and exports of



the whole northern department; Indians are employed in transporting goods, are very expert voyageurs, and engage readily in any duties required of them by the Company's officers; they are paid chiefly in clothing and other goods essential to them for making a winter hunt of furs; many of them died in 1836 from influenza."

#### CLIMATE AT MOUTH OF NELSON.

Extract from Arthur Dobbs' Account of the countries adjoining to Hudson's Bay, London, 1744.

(*Dobbs, p. 14.*)

"If I may depend upon a short sketch mentioned by Fox from Button's Journal, of his wintering in Nelson River, in 57 degrees in 1612, it would appear that the winter was not so long or severe at Port Nelson, as at Albany in 52 degrees, occasioned, I suppose, from the strength and height of the tide there, which rises near 14 feet, when at Albany it does not rise above 4 feet; for he says, altho' the river was not above a mile over, it was not frozen over that year until the 16th of February; and they had several warm thawing days before, and the river was clear of ice the 21st of April. But by this Journal, Albany River was frozen over the beginning of November, and the ice did not break up at the Factory until the beginning of May. I have seen no late Journal of the weather at York Fort, on the southern branch of Nelson river, so can't tell whether the climate be such now, as is here represented. But since the winter 1741 was so severe at Churchill River, only 2 degrees more northerly than Nelson River, of which the following journal was taken by Captain Middleton, I should suppose this more severe than usual, or wrote with a view to serve the Company, by setting it forth in its worst colors, or the climate at York Fort is more severe than is here mentioned from Button's Journal."

#### YORK FACTORY TO NORWAY HOUSE.

(*Ballantyne, chap. 9.*)

Ballantyne's "Hudson Bay" contains a description of another journey from York Factory to Norway House by way of the Hayes, Steel and Hill rivers. The party started on 23 June, 1845. At that time at York Factory, ice still lined the shores, and not a leaf was visible, but thirty miles inland the trees and bushes were well covered with foliage which appeared quite delightful after the leafless willows and patches of snow at the Factory. After two days' travelling they were at the mouth of the Hill River. Ascending that river, the face of the country was now greatly changed and it was evident that here spring had long ago dethroned winter.



(Page 225.)

"The banks of the river were covered from top to bottom with the most luxuriant foliage, while dark clumps of spruce fir varied and improved the landscape. In many places the banks, which appeared to be upwards of a hundred feet high, ran almost perpendicularly down to the water's edge, perfectly devoid of vegetation, except at the top, where large trees overhung the precipice, some clinging by their roots and ready to fall."

"In other places the banks sloped from nearly the same height, gradually, and with slight undulations down to the stream, thickly covered with vegetation and teeming with little birds, whose merry voices, warbling a cheerful welcome to the opening buds, greatly enhanced the pleasures of the scene."

(Ballantyne.)

The remainder of the description is a vivid picture of the delights and dangers of a trip in a canoe manned by a crew apparently determined not to lose a chance of drowning themselves, but containing nothing quotable here.

#### MR. J. W. TYRRELL'S WINTER JOURNEY FROM CHURCHILL TO NORWAY HOUSE.

In the summer of 1893, Mr. J. W. Tyrrell and his brother, J. B. Tyrrell, set out on an exploring tour on which they took in the Athabasca River and Lake, thence northeasterly across the Barren Lands until they reached the waters flowing into Chesterfield Inlet in the northern part of Hudson Bay; thence, in the month of October, along the shore of Hudson Bay to Fort Churchill, thence across country on snowshoes to Norway House. They left Churchill on Nov. 6. They met with plenty of game between that point and the mouth of the Nelson River. Arriving there they described the coast as follows:

"We are accustomed to thinking of a coast as a definite narrow shore line: but to the inhabitants of the Hudson Bay Region the word conveys a different meaning. There, the coast is a broad mud and boulder flat several miles in width, always wet and twice during the day flooded by the tide. At this time of the year the mud-flats were covered by rough broken ice and drifted snow but above high tide mark the surface of the country was level and the walking good."

The journey from Churchill to the Nelson including delay in getting across the river consumed nine days. It was accounted only one day's journey thence to York Factory but such was the severity of the weather that it took them ten days before York Factory was reached. Of that place, Mr. Tyrrell says:



(*Tyrrell, Subarctics, p. 241.*)

‘As to York Factory, it is one of those places of which it may be said, “the light of other days has faded.” In the earlier days of the “Hudson’s Bay Company,” it was an important centre of trade, the port at which all goods for the interior posts were received, and from which the enormous harvests of valuable furs were annually shipped. Such business naturally necessitated the building of large store houses and many dwellings to shelter the goods and provide accommodation for the large staff of necessary servants. As late as the summer of 1886, when I visited York, there was a white population of about thirty, besides a number of Indians and half breeds in the employ of the Company; but things had now changed. Less expensive ways of transporting goods into the interior than freighting them hundreds of miles up the rivers in York boats now existed, and as the local supply of furs had become scarce serious results necessarily followed.”

“Gradually the staff of servants had been dismissed or removed, and one by one the dwellings vacated, until York was now almost a deserted village. The Indians also had nearly all gone to other parts of the country.”

On 28 Nov., they set out on the ice of Hayes River for Oxford House, a H. B. post, some 250 miles distant. On 7th December they crossed a succession of 13 small lakes and some flat open plains, and in the afternoon saw a marked change in the character of the country. “With the exception of two or three isolated patches we had seen nothing in the shape of timber of any value since leaving York—indeed I may say since leaving Churchill, or even a thousand miles or so back on the road. But now we had reached a heavy forest of white spruce, jack pine, poplar and birch trees and the change was a pleasing one.” Late in the evening they reached Oxford House. The remainder of the journey, 150 miles, to Norway House on the north end of Lake Winnipeg was without noteworthy incident.

#### MARTIN’S FALLS, ALBANY RIVER.

(*Russell, p. 13.*)

“Speaking of Martin’s Falls, a post on the Albany River, upwards of two hundred miles north of Lake Superior, Mr. Barnston, who resided there, says that, “it has the winter of Russia and the July and August of Germany and France; that in the usual course of seasons the buds of the trees begin to swell about the 12th of May, and leaves expand about the 28th May,” (which is as early as they did in Ottawa this last spring). He says that “a night’s frost will sometimes intervene as late as the 10th June,” (which is the case in Central Canada, occasionally about the 15th June) that “by the first October foliage is yellow and falling. Usually there is a little snow by 20th October, and it covers the ground by 1st November.”



## SOME UNEXPLORED PARTS OF KEEWATIN.

In a paper written in 1892 the late G. M. Dawson, C.M.G., Director of the Dominion Geological Survey, "On some of the larger unexplored regions of Canada," the writer includes nearly all of the Keewatin district among the unknown tracts. He describes the boundaries of these unexplored parts as follows:

"Area between Severn and Attawapiskat Rivers and the coast of Hudson's Bay 22,000 square miles or larger than Nova Scotia. Several lakes and rivers are shown upon the maps in this region in practically identical form since Arrowsmith's map of 1850, but I have been unable to ascertain the origin of the information."

"Area between Trout Lake, Lac Seul and the Albany River, 15,000 square miles, or about half the size of Scotland."

## LIMIT OF PERPETUAL FROST.

In 1857, a Select Committee of the British House of Commons sat on the Hudson's Bay Company. Among the witnesses examined was Sir John Richardson, who accompanied Franklin on his first expedition and afterwards made several land journeys in the Hudson Bay Territory, questioned about the existence of perpetually frozen soil he said:

*British H. of C. Committee, 1857, p. 153.*

"I made some few observations myself, and at my suggestion The Hudson's Bay Company instituted a pretty extensive series of observations, to ascertain how far the ground-ice corresponded with that in Siberia. The conclusion to which I came was that there is permanently frozen ground almost everywhere near Hudson's Bay north of 56 or 57 degrees of latitude; north of the mean temperature of 32 degrees a portion of the ground is frozen the whole year. This isothermal line of 32 degrees in crossing the American continent, ascends to the north as it goes to the westward; it comes much lower upon the side of Hudson's Bay, and ascends obliquely from Rupert's House, on the 51st parallel of latitude near the Bay, crossing Beaver Lake, in latitude 55 degrees, and following the valley of the Mississippi to Isle à LaCrosse in latitude 56 degrees, but the mean limit may be considered as 55 degrees. There is permanent ice at York Factory, a very thick bed of it, which is never thawed."

## SURVEY ON THE ALBANY RIVER.

In the Report of the geological survey for 1871-2, Dr. Robert Bell, gives particulars of his survey of the country between Nepigon and the Albany River. The Albany River is the present northern boundary of Ontario. As what Dr. Bell says may be supposed to be descriptive of both sides of the river, part of his account is given below:



*Bell, Geol. Survey, 1871-2.*

"From the head of Makokebatan Lake to Martin's Falls, a distance of fifty-six miles, the general course of the river is N. 70 degrees E. Makokebatan Lake is nearly straight, and measures sixteen miles in length by one and a half in breadth. No rock in situ was seen upon its shores, which are strewn with small rounded boulders, interrupted in some parts by sand beaches, and the country all round is so low and level, that, looking from one end of the lake, the land cannot be seen at the other."

"At the eastern extremity of the lake the Albany flows out by two channels, which only come together again at Moosewake Lake, nearly twenty miles further down. Ten miles below Makokebatan Lake, the northern channel enters the lower part of Washi-sagaigan or The Lake of The Narrows."

"This part of the lake is four miles long, but the Indians informed me that the upper division approached close to a bay on the north side of Makokebatan Lake, and that a portage leads from one to the other. This would give it a length of twelve miles more, or sixteen in all, which is equal to that of Makokebatan, and the Indians also consider these two lakes to be of the same length. Washi-sagaigan was also formerly called Gloucester Lake from a Hudson Bay Company's post of that name, which existed many years ago at the Narrows. The distance from the Lake of The Narrows to Moosewake Lake is about five miles. Fine micaceous and dioritic schists (like those already described) running S. 65 degrees W. occur at the east end of the former, and again running south 30 degrees W. at the west end of the latter; while on the river, between these two localities, is exposed a massive reddish grey, micaceous gneiss, much of which is thickly studded with crystals of light red feldspar giving the rock a coarse porphyritic appearance."

"From Moosewake Lake to Martin's Falls (a distance of about twenty miles) the river is full of islands and rapids, and the rocks appear to consist entirely of fine grained green micaceous, dioritic and hornblendic schists, with which are associated small veins, strings and patches of quartz, and large veins and masses of coarse granite. Specks of copper pyrites were observed at one place in the dioritic schist. The average strike is west, varying to ten and sometimes to fifteen degrees both to the south and north of that course. The rapids mostly occur where great veins of the granite cross the river. Towards the end of the above twenty miles, bands of gneiss become interstratified with the schists, and just at Martin's Falls, the latter have become entirely replaced by red and grey gneiss, apparently shewing a conformable passage from The Huronian into the Laurentian rocks. What appeared to be a similar blending of these formations was noticed last year in the neighborhood of White Lake."



"At Martin's Falls there is only a rapid with a descent of about twelve or fifteen feet, down which light canoes are easily run."

"Fifteen portages occur between Makekebatan Lake and Martin's Falls."

"The greatest single descent is at Ka-ge-ami, where the river descends forty-five feet at one chute."

"The surface of the country on either side of this section of the river appears to be only slightly undulating, and the soil in many places seems to be good. The general direction of the glacial striæ is about W. S. W., corresponding with that of the upward course of the river."

"Between Abazotikitchewan Lake and Martin's Falls twelve rivers and large brooks enter the Albany."

"When at Martin's Falls, Mr. McKay, the gentleman in charge of the Hudson Bay Company's post there, kindly afforded me an opportunity of looking over the journals of the last forty years, which had been kept by his predecessors. From these I ascertained that the river between this point and James's Bay is open, on an average, six months of the year. Hay, turnips, and potatoes have been successfully cultivated for a long time at this post, and the cattle kept here thrive well."

"Below Martin's Falls the river changes its character entirely, becoming more uniform in breadth, depth and velocity of current. In the 120 miles which we surveyed to "The Forks," or junction of the Kenogami River, the width is from twenty to thirty chains, the depth in the middle from five to twenty feet (averaging about eleven), and the mean velocity about three miles an hour. Below the Forks, the river is described as maintaining similar characters all the way to the sea. A rapid occurs near the mouth, but this is said to be easily passed by boats both up and down."

"Except in very low water, the river would appear to be navigable by powerful steamers, with shallow draft of water, all the way from its mouth to Martin's Falls, a distance of about 250 miles. As shewing its freedom from obstructions, I may mention that the Hudson Bay Company's Boats, in descending, are allowed to drift all night with the stream, in any part of this distance, the submerged top of a fir tree being sufficient to keep them in the channel."

"From Martin's Falls to the junction of the Ogoke River, the Albany makes a curve to the north, equal to a semi-circle measuring over thirty-seven miles. The Ogoke is nearly twenty chains in width where it joins the Albany. From this point the latter runs due east for twenty-one miles, and then turns south-east, and maintains that course for upwards of sixty-one miles, to the Kenogami, which it joins at right angles; the Albany, at this point, turning abruptly to the north-east, while the upward course of the lowest stretch of the Kenogami is south-west."



"All the way from Martin's Falls to The Forks, the Albany is flanked by steep banks, either immediately overlooking the water, or rising at a short distance back from it. In descending the river their general height increases gradually from forty to about ninety feet, and they also become more regular and continuous in approaching The Forks. They are at first composed entirely of drab-colored boulder-clay, capped with sand; but, after reaching the palæozoic rocks, these deposits are by degrees replaced in the lower part of the banks, by drab and chocolate colored marls and shales, the upper part being usually composed of the boulder-clay overlaid by sand. The bed and shores of the river consist of either smooth, flat-lying rock, or small rounded boulders, packed closely together, and all brought by the drifting ice to a uniform surface, so that they bear a strong resemblance to a well laid pavement."

"Gneiss, with the usual east and west strike, was the only rock seen in situ from Martin's Falls to the most northern point of the great bend, but, immediately on passing this, yellowish limestone strata make their appearance in the bed of the river. Similar limestones, and others of a grey color, are seen in the bed and banks of the river, here and there, to within about twenty miles of The Forks, where they become replaced by the overlying drab and chocolate-colored marls and shales. The inclination of the strata towards the sea is greater than that of the bed of the river, so that the line of division between the chocolate-colored and the underlying drab marls and shales becomes gradually lower and lower in the banks, and at length sinks beneath the river bed. Layers of the two colors are interstratified with each other for a certain thickness at the junction, so that for some miles the banks have a banded appearance. In this interval a small quantity of soft, thin-bedded, grey sandstone occurs. The few fossils found in these rocks appear to indicate an equivalent of the Niagara formation; but in one place, just below the mouth of the Goose river, or three miles below the point where the river turns south-east, bright red marl occurs on the north bank, and on a small island, a mile further down, some loose fragments of a bright bituminous coal were found. The Hudson Bay Company's officers informed me that coal had never been brought into the country; and, considering that the conveyance of even light and valuable goods is so expensive in this region, this is only what might have been expected, so that I cannot suppose this coal to have been brought here by human agency."

"The large proportion of boulders of a very dark-colored granular quartzite, and the abundance of rounded fragments of a hard, banded, silicious hemanite, containing usually about fifty per cent. of iron, which occur in the drift along the Albany, are worth noting. These erratics have probably come from a long distance to the north-eastward, as indicated by their worn character and the direction of the glacial striæ."

"The country on either side of the Albany below Martin's Falls is quite level. The steep banks drain a narrow strip of land on either side of the river,



but beyond this great swamps appear to extend on all sides. Water is constantly oozing from the foot of the banks, rendering it very difficult to walk along the sides of the river, on account of the deep mud, except upon the boulder pavements already described. The Albany receives nineteen rivers and large brooks between Martin's Falls and The Forks."

### FOREST TREES.

In the Geological Report for 1879-80, Dr. Robert Bell gives information about the forest vegetation of the continent, derived from his own observation and from Hudson Bay officials, and from the data furnished by the accounts and maps of the different scientific travellers who have penetrated those regions. He gives the following description of the trees which prevail north of the present limits of Ontario:—

(*Bell, Geol. Survey, 1879-80, p. 44, c.*).

"WHITE SPRUCE, SINGLE SPRUCE, SEA SPRUCE. Pine of the Hudson's Bay Company's people (*Albies Alba*, Michx.) This and the next are the most northern trees of North America. Abundant and of good size in Newfoundland and the Maritime Provinces, where it is sawn into deals. The Indians of these provinces call it "Sea Spruce" to distinguish it from the next. Captain Kennedy informs me that south of the limit shown on the map, it is common in valleys and sheltered places throughout the Labrador Peninsula. It nowhere reaches the Atlantic coast, receding further and further on going north. On the south side of Ungava Bay, it is found at the mouths of Whale, George's and Ungava Rivers, large enough for building boats but the trunks are short and apt to be knotty. In going up the east coast of Hudson's Bay, it vanishes about latitude 57 degrees, or a few miles above Richmond Gulf, but it is said to extend further north at a distance inland. On the west coast of the Bay it extends to Seal River, in latitude 59, from which the northward limit runs apparently almost directly north-west to near the mouth of the Mackenzie River, or about latitude 68 degrees. According to Mr. Hearne and Sir John Richardson, it is found on the Coppermine River to within twenty or thirty miles of the sea. Around James' Bay, and between this Bay and Lakes Huron, Superior and Winnipeg, it attains a good size for lumber, and even on the Hayes and Nelson rivers I have seen good sound logs cut upwards of two feet in diameter, and showing from 100 to 140 lines of growth. Common throughout Quebec and Northern Ontario, but rare in the southern parts of the latter province. In the prairie country I have not seen it further south-west than Pine Creek about 100 miles west of Winnipeg."

1. a. "BLACK SPRUCE, DOUBLE SPRUCE, (*Abies Nigra*, Poir). Professor Gray regards the white and black spruce as probably only varieties of one species, and there certainly appears to be every gradation between the two



The white spruce grows on rich intervale grounds or near the shores of lakes and rivers; it becomes a moderately large tree, while the black spruce is found on hills and in cold swamps, and is a smaller tree than the other. The bark of the white spruce, when young, is smooth and grey, while that of the black spruce is brownish, and is always covered with small, loose scales, even when the trees are young. The two kinds have the same geographical range northward."

2. "AMERICAN LARCH, TAMARAC, RED SPRUCE, JUNIPER (*Larix Americana*, Michx.) All the way from Newfoundland to near the mouth of the Mackenzie River, the northern limit of this tree is only a little to the southward of that of the spruce. It is found along with this tree on the shores of Ungava Bay. In Newfoundland, New Brunswick and the Gaspé Peninsula it attains a good size, and is a valuable timber-tree on all the northern branches of the St. Lawrence and throughout the Ottawa valley, from which large quantities have been exported for shipbuilding, &c. It has an equally thrifty growth in the country to the south of James' Bay, and westward towards Lake Winnipeg. In this great region it attains its greatest perfection on the dry uplands and in good soil near the rivers, but smaller trees, with small black spruces, grow everywhere on the level or swampy grounds. South of the Ottawa it grows principally on low and level land."

3. "BALSAM POPLAR, BALM OF GILEAD, ROUGH-BARKED POPLAR, COTTON TREE, WHITE WOOD, ETC., (*Populus balsamifera*, L.) Abundant everywhere around the Gulf of St. Lawrence and throughout a great part of the Labrador Peninsula. Luxuriant but not of large size, along all the rivers of James' Bay and of the south-west side of Hudson's Bay, disappearing about Fort Churchill from which its northern limit runs to about latitude 65 degrees on the Mackenzie. On the east side of the bay small trees were seen as far north as Richmond Gulf. It is a very common tree and of large size in the valley of the Mackenzie, especially on the Rivière Aux Liards. It attains a considerable size around Lakes Huron and Superior, where the thick bark of old trees is used by the fishermen as a substitute for cork in making net-floats."

4 "ASPEN, COMMON POPLAR, TREMBLING-LEAVED POPLAR, (*Populus tremuloides*, Michx.) A rather more southern tree than the last, very common throughout the whole region from the Gulf of St. Lawrence to near the mouth of the Mackenzie River. It extends over the southern half of the Labrador Peninsula and around James' Bay. On the south-west side of Hudson's Bay it keeps some distance back from the coast. It is the commonest tree in the prairie and half-wooded parts of the North-west Territories. Throughout the Hudson's Bay Territory it is the principal fuel used by Indians and for open fires at the Company's posts, as it does not throw out sparks like the spruce and larch. In the Eastern Townships and elsewhere



it is used for the manufacture of paper. Although the most widely diffused tree of North America, it is relatively most abundant in the West, where it ranges from the Arctic regions to California. Professor Sargent remarks that it has "not yet been seen on the high peaks of the Southern Alleghany Mountains, to which it might naturally extend."

5. "CANOE BIRCH, WHITE BIRCH, (*Betula Papyracea*, Ait.) A very common tree along the northern tributaries of the St. Lawrence, and ranging as far north in the Labrador peninsula as Lake Naskopie and to within 250 miles, or perhaps less, of Ungava Bay, on the river of the same name. It attains its greatest perfection around the Gulf of St. Lawrence and in the Ottawa valley, and is also found of large size near Lakes Huron and Superior. In Labrador, on both sides of St. James' Bay, and north-westward to the Mackenzie River, it affords sufficiently large sheets of bark for canoe building. From James' Bay to the Mackenzie, which it strikes beyond the Arctic Circle, its northward boundary keeps near that of the Aspen, being sometimes on one side of it and sometimes on the other. In the most Southern parts of Ontario it is rare, of small size and found only in swamps. In the Red River region it ranges as far south as the United States boundary, and is found along the Assiniboine valley as far west as the Qu' Appelle Lakes."

6. "BANKSIAN PINE, SCRUB PINE, JACK PINE, CYPRESS, (*Pinus Banksiana*, Lamk.) This tree has not been noticed in Newfoundland, on the north shore of the Gulf of St. Lawrence, nor in the interior of Labrador beyond Lake Mistassini, although it may possibly have a somewhat more northern range in this peninsula than represented on the map. It occurs throughout Nova Scotia and New Brunswick. Starting from the head of the Bay of Chaleur, its northward limit appears to cross the other trees lines to the Lake just named, from which it runs west to the Moose River, keeping about 100 miles south of James' Bay. From Moose River it runs north-west to the Mackenzie, which it crosses about the Arctic Circle. It does not touch either James' or Hudson's Bay. Southward it is common on the north shore of Lake Huron and around both shores of Lake Superior, whence it is met with all through the country to Lake Winnipeg. The area over which it is distributed appears to be in the form of a belt, with a breadth equal to five or six degrees of latitude, running across the continent. Although a small and scrubby tree in the Southern and eastern parts of its range, in the central part, (both as regards latitude and longitude), it attains much greater perfection. On the southern branches of the Albany, I have seen great groves of these trees about seventy feet in height, and two feet in diameter at the butt, with straight trunks nearly free from branches for the first twenty or thirty feet."

7. "BALSAM FIR, FIR, VAR, SILVER PINE, BLISTER PINE—"PALM" in Cape Breton (*Abies balsamea*, Marshall.) The Maritime Provinces, Newfoundland and the southern half of the Labrador peninsula, its northern



limits in this region being on Naskopie Lake and the Ungava River. It flourishes best in the Gaspé peninsula, where I have seen many trees from twenty inches to two feet in diameter, with trunks tall enough to afford one good sawlog about fifteen feet. It occurs around James' Bay, but its northern limit keeps to the south-west of Hudson's Bay, where it passes between Fort Severn and Trout Lake, and reaches the neighborhood of the junction of the Shammattawa and Steel Rivers which form the Hayes River. From this point it turns south-west and crosses the Nelson River at the outlet of Sipiwesk lake, from which it runs north-west to the Mackenzie River crossing it about latitude 65 degrees. South-west of Hudson's Bay it grows only in the warmest and best soils, and is entirely wanting in the cold, swampy tracts. In Ontario, where it is cultivated as an ornamental tree, I have not observed it growing naturally south of the latitude of Toronto. In the North-west Territories it appears to be absent to the south and west of Lake Winnipegosis."

8. "WHITE CEDAR, CEDAR, ARBOR VITAE, (*Thuja Occidentalis*, L.) The geographical distribution of this species presents some very interesting features. In the Gulf of St. Lawrence region, its boundary runs south-east from Anticosti to the Bay of Fundy, directly across all the intervening tree-lines. It is absent from Newfoundland, Cape Breton, Nova Scotia, and the eastern half of Prince Edward Island, but is unusually large and fine in New Brunswick and the Gaspé peninsula, in which the climate, soil, etc., are the same as in the adjacent regions, where not a trace of the species is to be found. From Anticosti the limit runs south-westward to a point about 200 miles north of Montreal. Thence it turns north-west and reaches Rupert's House on James' Bay. From the neighborhood of Moose Factory the line crosses the Albany River at some distance from the sea, and continues westward to a point about seventy-five miles south-west of Trout Lake, where it turns south-west and reaches the southern extremity of Lake Winnipeg; thence it turns south-ward to the United States boundary, keeping to the east of the Red River all the way."

9. "BLACK ASH, SWAMP ASH, (*Fraxinus Sambucifolia*, Lam.) In Anticosti and Southern Newfoundland. From the neighborhood of Seven Islands, the northern limit runs west (curving slightly to the southward, to Lake Winnipeg. It is common, but of small size, along the different branches of the Moose River, especially towards the height of land. St. Peter's Portage on the Missinaibi branch is the most northern point at which I have seen it in this region. I have found small trees around the southern part of Lake Winnipeg, but have never noticed it further west.

10. "WHITE ELM, SWAMP ELM, GREY ELM, AMERICAN ELM (*Ulmus Americana* willd.) With the exception of the northern group, this species has the widest range of any tree in Canada. It extends from the southern part



of Newfoundland to the base of the Rocky Mountains. It occurs at the head waters of all the principal branches of the Moose River, and on one of them, the Missinaibi, I found an outlier within 120 miles of James' Bay. On the Kenogami it extends to a point about half-way from Long Lake to the Albany. The northern limit intersects the east shore of Lake Winnipeg and gains its highest latitude (about  $54\frac{1}{2}$  degrees, on the main Saskatchewan, where Mr. A. S. Cochrane last summer observed some good-sized trees not far from Cumberland House. Professor Macoun says "he has found it on Tail Creek, which discharges Buffalo Lake into Red Deer River, a branch of Bow River". In the plain country, near the United States boundary line, the writer met with fair-sized trees in valleys in the wood mountains, and in different valleys to the northward of them. The trees in such situations are not visible from the table-lands until the brink of the valley is reached, and are locally known as "Sly-Woods." It grows to a large size along the Red and Assiniboine Rivers."

"BURR OAK (*Quercus macrocarpa*, Michx.) The limit of this species in Canada extends from the International boundary on Lake Superior north-westward to the north end of Lake Winnipegosis from which it drops south to the Dakota line in the vicinity of the Souris River. Professor Winchell writes that it is scattered all over the State of Minnesota. It attains a good size on the Rainy River and in the district between Lake of the Woods and Winnipeg River and the Red River, also along the Red and Assiniboine rivers. On the English River it was first observed about half-way from Lonely Lake to the Winnipeg River. It extends northward on Lake Winnipeg as a tree to the Loon Straits, and as a bush to Beren's River. Small trees occur along the Swan River and north branch of the Assiniboine. Professor Macoun has not noticed it west of Spy Hill, near the Qu' Appelle River."

## GEOLOGY.

(*Bell, Geol. Survey, 1879-80.*)

Geologically, the basin of Hudson Bay, excluding the western or Winnipeg division, lies within the great Laurentian area of the Dominion. Cambro-silurian rocks, resting almost horizontally upon these, form an irregular border along the southwestern side of the bay, and in the valleys of some of the rivers they extend inland from one to two hundred miles.

On the western side of the bay from Churchill northward, quartzites and other rocks which may also belong to the Cambrian system appear to be largely developed. Valuable minerals may be looked for on this coast. The extensive level region around the southwestern side of the bay is overspread with a great sheet of boulder clay which is generally covered by the modified drift. The rocks of the outlying or Winnipeg division of the basin, comprise an extensive series ranging from the Laurentian to the Tertiary.



## BETWEEN LAKE WINNIPEG AND HUDSON BAY.

In 1878, Dr. Bell made an examination of the country lying between Lake Winnipeg and Hudson Bay. His report of operations is contained in the Report of the Geological Department for 1877-78. The following extracts are taken from it:—

(Page 3, *cc.*)

## FROM NORWAY HOUSE TO YORK FACTORY.

Norway House is situated on the Nelson River about 20 miles below its efflux from Lake Winnipeg. "The travelled boat route from Norway House to York Factory does not follow the Nelson river (except for a short distance below the former) but a series of lakes and streams lying to the southward of it. The distance between these posts in a straight line is 301 miles by my map. Lake Winnipeg has been ascertained by the engineers of the Canadian Pacific Railway to be 710 feet above the sea. Notwithstanding this considerable amount of fall, in going from Norway House to York Factory, the difficulties of boat-navigation in descending are not great, but are more serious in returning. In the downward journey it is necessary to haul the boat over dry ground only three times, namely, to the water-shed of the Echimamish, the Robinson portage and the Trout Fall. These portages measure 28, 1,315 and 24 yards respectively. All the other rapids are run by York boats, and mostly with a full cargo, but at some of them more or less of the load requires to be carried past by land. In the upward journey there are in all about 20 demi-charges, or hauling places, and in addition to the three complete portages which require to be made in going down, there is a fourth, the Island portage, about forty yards in length."

"The boat-route leaves the east channel of the Nelson River 25 miles below Norway House, and turns up a small, swampy and marshy stream called Echimamish. In the interval the river is full of islands, and would average about a mile in width, including them. The shores are rather low, but are not often swampy. The banks consist of a light-colored clay, with gneiss frequently appearing underneath it, and forming the points and smaller islands. The timber consists of spruce, tamarac, Banksian pine, white birch, aspen, balm of Gilead and willows, with a little balsam fir."

"A chute, with a descent of about four feet, called Sea River Fall, occurs in the east channel at 17 miles below Norway House, or 37 from Lake Winnipeg. Loaded boats run down this chute, but it is necessary to unload and track them up the current."

"The Cree word 'Echimamish' signifies a channel in which the water flows each way. Its course is eastward, and at twenty-eight miles in a straight line from the east channel, we come to an abrupt termination of the



western part, at a low rock called the Painted Stone, twenty-eight yards in width, which forms the watershed of the channel. Hairy Lake and two dams, with a rise of about one foot at each, are passed in the above interval. The boats are unloaded and hauled over the little water-shed, and launched into what is regarded as a continuation of the same channel. The White-Water River, which discharges Little Lake Winnipeg, joins the eastern Echimamish on the south side, at seven miles from the water-shed. From this point to Oxford Lake, the stream having no recognized name, I propose to call it Franklin's River, after the late Sir John Franklin, who had a narrow escape from drowning in it, near the White-water, in 1819."

"Around Rainy Lake, and on either side of the valley of the Echimamish, low domes of rock occur occasionally near the route, and ridges which appear to rise to a height of seventy or eighty feet, are seen in some places at a distance of two or three miles back. The Echimamish cuts off a smaller border along the southern edge of the Huronian trough, which will be described further on; but from the confluence of the White-water, gneiss was the only rock observed along Franklin's river all the way to Oxford lake. Franklin's river flows successively through Robinson's Pine and Wind lakes. Robinson Portage, the most formidable one on the whole route, occurs at the foot of the lake of the same name. The carrying-trail which is as wide and smooth as a good waggon road, passes over the light grey clay soil which prevails everywhere in this part of the country. The descent in Franklin's river, between the extremities of the trail, was ascertained by the aneroid barometer to be forty-five feet."

"A swampy lake, without any name, extends for some miles eastward, from the foot of Robinson's Portage. Seven miles below this portage the river enters a narrow and nearly straight ravine, with walls of gneiss from thirty to seventy feet high, through which it flows for a distance of seven miles to Pine Lake, two rapids occurring in the interval. The south side of Pine Lake is bordered by small hills, but to the north-eastward a low tract extends all the way to Windy Lake around which the country has a slightly undulating aspect. From this lake the river runs north-west, or at right angles to its usual course, and at the end of four miles falls into the head of a marsh on the level of Oxford Lake. Here there is a chute called Wapinainis, or the Angling Place, with a descent of about six feet. The marsh referred to opens by a narrow strait into the south-western arm of Oxford Lake."

"Oxford Lake runs north-east and south-west, and has a length of about 30 miles, with a maximum breadth of eight or nine miles. It contains many islands, and is much subdivided by long points. With the exception of the south-western arm it is situated entirely within the Huronian trough, and the rocks around it will be described in connection with this basin. Oxford



House, a post of the Hudson's Bay Company, is situated on a rising peninsula formed of light grey clay, at the north-eastern extremity of the lake. This lake is also called Holey Lake, or more properly, Deep-hole Lake, from a small conical hole on the north side, one mile west of Oxford House, which, according to the Indian belief, has no bottom, but it is in reality only 60 feet deep. The extension of the lake beyond Oxford House is called Back Lake."

"From Back lake the water passes by Trout River, which runs south-east to the head of Knee Lake—the distance, in a straight line, being 11 miles."

"Knee Lake has a total length of 40 miles. It consists of two principal expansions, each running north-east and south-west, connected together about midway between the inlet and outlet by a narrower portion, about nine miles in length, running north and south. The lower part is the widest and has a maximum breadth of about six miles. The whole lake is studded with islands, but they are particularly numerous in the central part, which is a closely crowded archipelago. This lake and trout river lie wholly within the Huronian trough already referred to. A few small hills are seen at the head of the lake and at some other localities near its shores, but with these exceptions, the country presents all around a low and horizontal outline. The soil consists principally of light grey clay and brown gravelly loam but near the lake, on the north-west side of the lower expansion, much of it is sandy. The timber on this shore has been burnt within a recent period, but elsewhere it is green and of vigorous growth."

"Wolverine river, which forms part of the canoe route to God's Lake, enters the north-eastern extremity of the upper expansion. It may be mentioned that this large lake discharges by the Shamattawa river and not into Knee lake as represented on sketch maps."

"Knee Lake discharges at its north-east extremity by Jack River into Swampy Lake. Jack River runs north-eastward, and has a length of ten miles, in a straight line. It has a considerable descent in the lower half of its course, the rapids being over ledges of Laurentian gneiss and mica-schist or boulders of the same rocks."

"Swampy Lake is a narrow strip of water ten miles long, and has the same north-east course as the river above and below it. Its name is derived from a point composed of peat on the north-west side, about half way down. The surrounding country is low but not apparently swampy. Around the upper part of the lake the rocks consist of dark-colored mica-schist, with veins and masses of coarse granite. This is the last lake on the route."

"From Swampy Lake to York Factory the river curves regularly round from a north-easterly to a nearly northerly course. It is called Hill River as far as the junction of Fox's River, when it becomes the Steel River to its



confluence with the Shamattawa, from which the united stream, all the way to the sea is called Hayes' River."

"Leaving Swampy Lake, Hill River, for 19 miles, flows through a labyrinth of small islands. Although the banks are low, there is a very considerable and tolerably regular descent in this distance, the river being broken by a great number of rapids, all of which, however, may be run by boats. The bed of the river, and the innumerable small islands are mostly formed of angular blocks and fragments of gneiss. This rock occurs in situ at some of the rapids. It is mostly very micaceous. At the end of the stretch so full of islands, clay banks first make their appearance on both sides and continue all the way to the sea."

"Brassy Hill, or the hill from which the river derives its name, and which is the only hill known to exist in the whole region, is a remarkable isolated mound of gravelly earth 392 feet in height. Its summit lies three-quarters of a mile east from the river, and four or five miles beyond the lower termination of the labyrinth of islands."

"The clay banks are about 30 feet high where they begin, but in descending the stream they increase by degrees to 100 feet in the neighborhood of The Rock and then gradually diminish to 60 feet at Fox's River. An average section of these banks in the interval consists of 50 feet of hard bluish or yellowish-grey drift clay, in which the pebbles are not conspicuous as components and boulders are rare, overlaid by 20 or 30 feet of stratified bluish clay with occasional boulders. In the last nine miles before reaching Fox's River, Hill River winds, with great regularity of distance from bend to bend, between banks about 80 feet high, and three-quarters of a mile apart. They consist of 40 to 50 feet of drift at the base, and 20 to 30 feet of stratified bluish clay, or the same thickness of yellowish-brown gravelly earth at the top, with occasionally a bed of gravel between them."

"From Brassy Hill to Fox River, few islands occur in the river, which has an average width of only about two chains. Several rapids and chutes over ledges of gneiss underlying the clay, occur in the first 13 miles below Brassy Hill. The last one, at the end of the above distance, or 109 miles above York Factory, is called The Rock from a considerable exposure here of dark-grey, rather coarse gneiss. Gneiss was last seen in the bed of the river about six miles below The Rock, and it is supposed that the palæozoic basin of Hudson's Bay is entered upon in this neighborhood."

"The character of the river changes at The Rock; and from that point downward no more rapids occur all the way to the sea. The stream is shallow at low water and runs with a swift current to the head of tide-water, about nine miles above York Factory. The gravelly or sandy beach which is exposed during the summer, nearly all along between the foot of the clay banks and the water, affords good walking for the men employed in tracking loaded boats up-stream."



“Steel River, or the section of the route between Fox’s River, from the left at 79 miles from York Factory, and the Shamattawa, from the right at 50 miles from the same point, has a width of about three chains. Clay banks, with an average height of 70 feet, are continuous on both sides of Steel River throughout its whole course. Marine shells, chiefly *saxicava rugosa*, derived from the upper beds, were noticed all along this section of the river.”

“The Shamattawa appears to be a larger stream than the Steel River, with which it unites and forms.

#### HAYES’ RIVER.

This last has an average width of about ten chains as far as the “Penneygutway,” a small stream from the left, 24 miles above York Factory. Below this, the width is one-quarter of a mile, but increases regularly to half a mile, and opposite York Factory it has become one mile. About a mile above “Penneygutway” the river gives off a channel on the right, which is of considerable size during floods but is nearly dry at low water. It emerges again about three miles above York Factory, and is here called “Ten-Shilling Creek.” In descending Hayes’ River, the clay banks diminish in height from an average of 50 feet at the termination of the Steel River to 27 feet at York Factory. Along the stream above described, from the Rock downward, islands are almost entirely absent, until the head of the tide-water is reached. Here three wooded islands occur in succession, and below them is a chain of low islands near the south-east side, covered with grass, and affording abundance of hay for the cattle kept at York Factory. The unaltered palæozoic rocks are not exposed on any part of the above route and their existence under the drift from near The Rock to York Factory is only inferred from the presence of limestone debris in the shingle, from the absence of the older metamorphic rocks and from the general character of the country, which resembles that along the lower part of the Nelson River, where these rocks actually crop out.”

“With the exception of the Huronian trough, already referred to, all the rocks seen in situ along the boat route from Lake Winnipeg to Hudson’s Bay, which has just been described, consist of varieties of Laurentian gneiss. These are not considered of sufficient interest or importance to merit a detailed description, and it is believed that the following summary of their dip, strike and general character, will be sufficient for present purposes. A knowledge of the direction of the strike in all these localities will be of service in the future working out of the geological structure of the surrounding country. It will be observed that its general run is about west-south-west, or in the same course which prevails over a vast area to the north and north-west of Lake Superior.”



### LOWER PART OF NELSON RIVER.

"An exploration of the Nelson River was made for a distance of about 90 miles from the sea, following the stream. The mouth of Hayes and Nelson Rivers are separated from each other by a low tongue of land called Beacon Point. The shallowness of the water and the low monotonous character of the shores everywhere in this vicinity renders it difficult to draw a definite line between land and water. Extensive shoals stretch for miles out from the extremity of Beacon Point and from the shore to the north and south of the estuaries of the two rivers. Owing to these circumstances, the outline between the land and water is widely different at high and low tide. The difficulty of mapping the shore accurately is increased by the fact that the sea is receding at an appreciable rate, and also from the circumstance that the tides are of very irregular height, owing to the shallowness of the water for long distances in all directions and the great effect which the winds consequently have in increasing or diminishing the rise and fall."

"THE MOUTH OF THE NELSON RIVER at high tide has a breadth of six or seven miles opposite the extremity of Beacon Point, but it contracts rapidly, having a trumpet-like outline, and for the first ten miles up, the width is from three to four miles. It continues to narrow gradually to Seal Island at the head of tide-water, or 24 miles from the extremity of Beacon Point, (at high tide) where it is only one mile and a half broad. Above this it varies from half a mile to a mile and a half as far as we went. When the tide is out the greater part of the space between the banks in the estuary of the river is dry and consists of a dreary stretch of mud-flats dotted with boulders, constituting a continuation of the shoals further out. A narrow channel with a somewhat irregular depth of water winds down the centre of the estuary. From the soundings which I took it appears to have an average depth of from two to three fathoms at low tide from a point abreast of Beacon Point for about 20 miles up."

"At the mouth of the river the ordinary spring tides amount to about 12 feet and the neap tides to about six feet, so that at high tide from three to five fathoms may be found throughout the above distance. The shallowest part of the river which we sounded was abreast of Gillam's and Seal Islands, or just where the tide ends and the proper channel of the river begins. Here the water was only about ten feet deep, but from this point upward, as far as we went, the average depth of the centre of the river was found to be 20 feet, and sometimes our soundings showed over 30 feet of water. In this section of the river, the velocity of the centre of the stream varied from about two to six miles an hour, according to the experiments which were made with the submerged tops of spruce trees, in order to ascertain the rate, at least approximately. The swift parts are short and the mean



velocity may, perhaps, be taken at from two and a half to three miles per hour and the average width at three-quarters of a mile between the water margins."

"A short rapid occurs a few miles below the highest point to which we explored the river, but it does not appear to be too swift to be surmounted by steamers. Above it, the Indians report no obstructions for about 15 miles, when a cascade, called

#### LIMESTONE FALLS

is reached. The Nelson River may, therefore, be said to be navigable for river steamers at a distance of about 100 miles from the sea."

"The distance from York Factory to the extremity of Beacon Point is about five miles. In going towards the latter, the banks gradually diminish in elevation from 27 feet at York Factory to the level of high tide at Beacon Point. They consist of stratified greyish clay combined with more or less fine sand. Below high tide the beach in the above interval consists of a muddy bluish clay with rounded pebbles and some boulders and contains marine shells, which are tolerably plentiful. Among those collected Mr. Whiteaves recognizes the following:—

- Leda pernula* (Moll).
- Nucula tenuis*, Var. *inflata* (Hancock).
- Mytilus edulis* (Linn).
- Cardium Islandicum* (Linn).
- Macoma calcarea* (Chemnitz).
- Saxicava rugosa* (Lamark).
- Buccinum tenue* (Gray).
- Natica affinis* (Gmelin).

"As already stated the shores about the mouth of the Nelson River are very low and flat. Banks of clay, at first only a few feet high, begin to appear on both sides about ten miles above the extremity of Beacon Point, and in ascending the river, the banks of clay on either side gradually rise till a point is reached about 54 miles in a straight line from Beacon Point, where they are nearly 200 feet in height, and above this, as far as observed, they maintain about the same elevation, either immediately overlooking the river or at a short distance back from it. A layer of peat averaging about four feet in thickness, was observed almost everywhere at the top of the bank on either side and extending inland. At Flamborough Head, a prominent point on the north-west side, 19 miles from Beacon Point, the clay bank has attained a height of 126 feet. It consists of hard gravelly drift-clay with some boulders at the bottom, and drab-colored stratified clay towards the top. At and near the top, marine shells are abundant. Among the species observed were:—



*Buccinum undatum.*

*Tellina Grælandica,*

*T. proxima.*

*Mya arenaria.*

*Leda pernula.*

*Saxicava rugosa.*

*Cardium Islandicum.*

"About 35 miles further up, where the bank on the south-east side has reached its maximum height of nearly 200 feet, it consists entirely of thinly stratified, yellowish-grey, fine clayey-sand or sandy clay, the thickest beds not exceeding seven inches, while others are only one inch thick. The thicker and thinner beds alternate with great regularity in some portions of the cliff. In one place in this vicinity, the whole depth of the deposit is seen in a perpendicular wall, which forms a favorite resort for great numbers of cliff swallows, their nests being built under the protecting edges of beds of the hard dry clay. Marine shells of most of the above named species are washed out of this bank, large valves of *Saxicava rugosa* being the most common."

"No islands occur in the estuary of the river, but from the head of tide, in the distance to which I descended, upwards of 20, covered with timber, were passed, besides a number of others on which only grass was growing."

#### ISLANDS IN NELSON RIVER.

"The wooded islands are comparatively high, while the grassy ones are low and flat, and are evidently swept over by the river ice when it breaks up in spring. From the Puck-wa-ha-gun River (60 miles from Beacon Point) upward, wide flats covered with good grass occur, here and there, on both sides of the river. The grassy islands and flats probably owe their preservation to the underlying horizontal beds of dolomite, which prevent them from being worn away by the force of the ice."

"The dolomite, which is probably of Upper Silurian age, was first found in situ, in ascending the stream, about two miles above the Puck-wa-ha-gun River, or at 62 miles in a straight line from Beacon Point, where it is exposed at the edge of the water on both sides of the river. It was also met with on the south-east side at two and again at six miles further up. At the latter place, a cliff of 30 feet of it rises perpendicularly from the edge of deep water, beneath which the escarpment is continued downward."

"At all the foregoing localities the rock has a yellowish-grey color, is rather fine grained, soft and generally earthy, although some of the beds appear to constitute a tolerably pure dolomite. It is thinly bedded, with the exception of a few bands, for a foot or more in thickness at the last locality. The only fossil observed was an obscure *Pentamerus*, which was



abundant in one of the beds, but none of the specimens were sufficiently well preserved to identify the species."

"A slight rapid occurs near the highest point reached. Below it the river is narrower than it is above, and here there is evidence of great ice packing in the spring. On the sloping bank on the north-west side, the timber is prevented from growing below 45 feet above the river. The outermost trees standing on this level are barked by the ice and boulders, which have been pushed diagonally up the slope. A great amphitheatre is excavated in the opposite bank, evidently by the water passing a temporary dam of ice, blocking up the river by piling at this point after a spring shove. On the 18th July last, some ice still remained on the north-west bank, opposite to this amphitheatre-like excavation, but was melting rapidly under a hot sun."

"The timber along the lower part of Nelson River consists principally of spruce, tamarac, aspen and balm of Gilead. On the islands and lower levels, the spruce attains a good size and would be very suitable for building purposes, but on the level ground, stretching away from the tops of the banks, the timber is smaller and the ground is covered with a thick growth of sphagnum under which a layer of peat, of variable thickness is seen at the brink of each steep clay bank."

"The detailed survey of a portion of Haye's river which was made in the vicinity of York Factory, extended from the mouth for a distance of about 12 miles up the river. The distances were ascertained by the Rochon micrometer-telescope and the bearings were taken with a prismatic compass."

"Immediately after my return to Norway House, I proceeded to make

#### A TRACK SURVEY OF THE NELSON RIVER

downward. This was accomplished to a distance of 180 miles from the commencement of the river at the outlet of Lake Winnipeg. Before returning partial surveys were also made of Cross and Sipi-wesk Lakes, which lie in the course of the river in this distance. Finally, a track-survey was completed of Great Playgreen Lake and the channel on the west side of Ross' Island and the Whiskey-Jack Portage, which leads from it to Cross Lake."

"The region through which the upper two-thirds of the Nelson River flows may be described as a tolerably even Laurentian plain, sloping towards the sea at the rate of about two feet in the mile. The river, for the first 100 miles from Great Playgreen Lake does not flow in a valley but spreads itself by many channels over a considerable breadth of country. This tendency to give off "stray" channels is characteristic of numerous rivers throughout the northern and comparatively level Laurentian regions but it is perhaps more strongly marked in the Nelson than in any others. In the above section of this stream, the straggling channels are of all sizes, from mere brooks up to large rivers."



"In their various courses towards the sea these channels, here and there, unite either wholly or partially, but often only to divide again, and thus they constitute a sort of network of rivers, the islands between them being of all sizes and shapes. The channels themselves consist of a series of dead water stretches separated by chutes or rapids at longer or shorter intervals, which, however, vary much in the different channels."

"The greatest descent at any one of the chutes visited takes place at the

#### WHITE-MUD FALLS.

and amounts to about twenty feet. These falls are divided by islands into three parts, and the "discharge" on which they occur is supposed to represent about half the volume of the Nelson River. The White-Mud Falls were considered to represent more than twice the quantity of water which passes over the Chaudiere Fall at Ottawa. Should this estimate be correct, the whole body of the Nelson River would be more than four times as great as the Ottawa at the above fall.

"Following the channel on the east side of Ross' Island the first break in the smooth water extending down from Lake Winnipeg is the Sea-river Fall at 37 miles from the outlet."

At 21 miles further down we come to Pipestone Lake, which is on the same level as Cross Lake, and separated from it by an irregular strait five miles long."

"Between the level above Sea-river Fall and that of Pipestone Lake there are, in all, ten rapids with a total fall of about 30 feet. Making an allowance of ten feet more for the current in the smooth portions of the river, there would be a difference of about 40 feet between the level of Lake Winnipeg and that of Pipestone and Cross Lakes."

"By the channel on the west side of Ross' Island the navigation is uninterrupted from Lake Winnipeg all the way to Big-reed Lake, one part of which comes within four miles of the southern extremity of Cross Lake. Between Cross and Sipi-wesk Lakes ten more rapids occur, with a total fall of about 80 feet. This, with 20 feet for the current in the intervals between the rapids, would give a total descent of 100 feet from the one to the other."

"Below Sipi-wesk Lake no rapids properly speaking, were met with as far as I went, but two others are reported to exist before Split Lake is reached."

"Above Sipi-wesk Lake the first rapid occurs at the Chain-of-Rocks, four miles up, and is very slight, having a fall of less than two feet. It could, no doubt, be easily passed by steamers. But the

#### RED-ROCKS RAPIDS

at seven miles from the lake, are more serious, and would terminate the upward navigation of this section of the river. From these rapids, downward,



including Sipi-wesk Lake, there appears to be no insurmountable obstruction to the navigation of the river by steamers till the higher of the two rapids above Split Lake is reached, a distance of upwards of 100 miles."

"Sipi-wesk Lake and the first 12 miles of the river below it run nearly north-east or with the general strike of the Laurentian gneiss and mica-schist on which they are situated, but at the above distance the river assumes a course bearing due north by compass (nearly north-by-east astronomically) or diagonally across the strike of the gneiss and the course of the glacial striae, both of which have a general N.E. and S.W. bearing. The branches from the right, in this interval, run south-west while those from the left flow north-east."

"The whole of the waters of the Nelson River appear to have come together in this stretch for the first time since leaving Great Playgreen Lake. The width now averages about a quarter of a mile, or rather more, with a depth of from 40 to 50 feet. The current runs at the rate of about three miles an hour in the middle, except at two very narrow parts where it is considerably greater. Owing apparently to the considerable depth of water across the greater part of the bed of the stream, strong eddies are found on both sides which greatly facilitate the upward navigation of this part of the river. The remarkably straight north-and-south stretch of the river is reported to extend as far as Split Lake. Its eastern bank consists almost entirely of drift clay, while gneiss is exposed nearly all along the west side."

"This singular part of the river no doubt owes its location to the existence of a great dyke of dolerite, which appears to run along its whole course. Its width probably corresponds nearly with that of the bed of the stream, which has been excavated out of the trap, the latter appearing only on the extremities of points on either side and on the two or three small islands. The dolerite is divided by joints parallel to its course and is very friable. It is coarsely crystalline and has a dark brown color near the surface, owing to the presence of oxide of iron, but some fresh fractures show a dark, somewhat greenish-grey color. In some parts, white calcspar and compact olive-colored serpentine are developed in thin sheets in the numerous longitudinal joints and also in the horizontal and vertical transverse partings, so that rectangular pieces of the dolerite, which crumble out, are completely encased in these minerals."

"Small streaks of magnetic iron, running parallel to the walls, were found in one part of the dyke. The dyke itself may have a width of from 200 up to 1,000 feet or more, and owing to its friable nature and to its decomposing more rapidly than the gneiss of the surrounding country, it has been easily removed during the glacial period and the present channel excavated. In some places the gneiss immediately adjoining the dyke on



either side has been altered and jointed parallel to the walls, by the action of the trap. This would also aid in facilitating the scooping out of its channel. Both the gneiss and the harder points of the trap forming its walls are rounded and striated by glacial action. The same dyke may be continued, with an altered course, up through Sipi-wesk Lake."

"At a point on the west side of the river, two miles above the inlet of this lake, a great dyke makes its appearance and is probably a part of the same one which crosses the stream two miles further up, forming the Chain-of-Rocks. The dolerite is here of the same character and contains the same peculiar serpentine as the dyke along the straight stretch of the river just described."

"Along the latter stretch, and also on the shores of Sipi-wesk Lake and the river above it, dark grey finely crystalline dolerite is frequently seen in the form of dykes of greater or less width, and also as patches filling angles in the walls of gneiss overlooking the water. On the sides of the straight stretch, these dykes generally run nearly parallel with the main one, but some of them follow the south-westward course of the stratification of the gneiss, and diminish in size in receding from the river, as if they were off-shoots from the great dyke."

"Huronian rocks are developed in considerable force around Pipestone and Cross Lakes apparently in continuation of the Oxford and Knee Lake troughs, but with this exception, the whole region explored along the upper part of Nelson River is occupied by Laurentian gneiss, diversified only by mica-schist and trap dykes."

"The general aspect of the country along the upper part of the Nelson River is even, or slightly undulating, the highest points seldom rising more than 30 or 40 feet above the general level. Whiskey-Jack "Mountain," opposite the foot of Sea-River Falls, is only from 30 to 60 feet high. The "High Rock," four miles above the entrance to the Echimamish, has an elevation of only about 50 feet. Such terms, applied by the inhabitants to mere banks and hummocks indicate the general level nature of the country."

"On the north-west side of the inlet of Sipi-wesk Lake the hills rise to a height of from 100 to 150 feet, and appear to be composed of clay or drift materials. Along the north-west side of the lower part of this lake, the ground has an elevation of about 100 feet."

"Partridge Hill, seven or eight miles eastward of the outlet of the same lake, is the highest point observed in the district, and has an elevation of about 200 feet above the water. The solid rocks of the region are generally overspread with the prevailing grey clay, which, in some cases, is liable to bake and crack in the sun, but in others it forms a soft mellow soil of excellent quality."



"Of course a good deal of fixed rock is exposed at the water's edge along the principal water courses, but even in these situations, the upper parts of the banks, including those of the smaller islands, are generally composed of clay."

"On either side of the channel west of Ross' Island the country is rather barren. The shores are low, and consist mostly of points and knobs of gneiss with sandy bays, and bogs and marshes between them."

"Whiskey-Jack Portage, which connects the heads of two bays from opposite directions, passes along a strip of dry, coarse sand, which looks as if it might have formed the north-western side of an ancient water-course."

#### HURONIAN TROUGH.

"The Huronian rocks of Pipestone and Cross Lake, the Echimamish, Oxford Lake, Trout River and Knee Lake, all probably belong to one basin or trough running in a south-westward course, conforming with the general trend of the Laurentian gneiss and mica-schists. Its extremities probably lie near the west side of Cross Lake to the south-west and the outlet of Knee Lake. Its total length would, therefore, appear to be about 143 miles, and it has probably an average breadth of above 14 miles, and an area of about 2,000 square miles. It presents a considerable variety of crystalline schists coarse diorites, etc. These like the Huronian rocks in other parts of the Dominion, may prove to be the repositories of valuable minerals, and, therefore, the area indicated is of more interest than the great gneissic region around it. The principal variety of rocks examined within this trough, will be described in the order of their occurrence from south-west to north-east. The directions of the strike, etc., are referred to the magnetic meridian."

"On the southern shore of the main body of Pipestone Lake the prevailing rock is a dark green laminated calcareous hornblende schist, with vein-like streaks and lenticular patches of white quartz. It runs N. 70 degrees W., and dips southward at an angle of about 75 degrees. On an islet about one mile off the central part of this shore there is a softer hornblende schist with laminae of white calcspar and bunches of quartz with chlorite, associated with a glossy-surfaced chloritoid schist."

"An island about a mile to the north-west of the last is composed of massive grey, rather coarsely crystalline diorite,"

"The islands in the outlet of the lake consist of green hornblende and mica-schists, with irregular veins of bluish-grey quartz, conforming with the stratification, which here runs north 70 degrees W., and dips northward at an angle of 80 degrees. Along the strait five miles in length, which connects Pipestone Lake with Cross Lake, the rocks on both sides consist of grey mica-schists, with pebbles of different kinds and rounded grains of quartz, either closely crowded together or scattered sparingly through the mass."



"At a point on the south side of the strait, and two miles from Pipestone Lake a conglomerated band occurs in the midst of a grey, rather soft, and somewhat fine-grained mica-schist running north 55 degrees W., dip N.E., 80 degrees. The pebbles in the conglomerate range from coarse sand up to the size of a child's head. Most of them approach a spherical form, and consist of fine-grained, hard grey syenite. Others are of white quartz, and are also well rounded."

"At a point on the north side of this strait, just before entering Cross Lake, a few large and somewhat angular boulders of a light grey steatitic schist rest on the pitted surface of a massive grey silicious mica-schist holding an abundance of small pebbles, which have a tendency to occur in bunches. The steatitic schist which an Indian afterwards informed me is to be found *in situ* somewhere in the vicinity, breaks into ligniform splinters, and is used by the natives for making tobacco pipes, from which circumstance the adjoining lake derives its name. Along the eastern side of the (Indian) Reserve Island and adjacent smaller islands, from Otter Island to Big-Stone Point, the rock is a dark green calcareous hornblende-schist with some fine grained mica-schist of the same color. The strike is S. 60 degrees W., dip, south-eastward 85 degrees."

"At Big-Stone Point, the Laurentian gneiss begins. A dark grey, coarsely crystalline massive diorite occurs along the narrows on the east side of the Reserve Island, and the opposite point on which Chief Taipistainum resides. Two miles further north, a light grey massive quartzite was found on both sides of the same channel. The extreme north point of the Reserve Island is formed of a dark grey granite or granitoid gneiss, in which the lamination is very obscure."

"A small dyke of fine grained dark-grey dolerite running north 5 degrees W. here cuts this rock. Grey mica-schist was found on all the islands visited in the western part of Cross Lake, between the Reserve Island and the outlets."

"On an island, a mile south of the central outlet, (one of a chain running with the strike) the mica-schist is of a conglomerate character, being full of pebbles and small lenticular masses of grey syenite and quartzite. The matrix is rather coarse, dark grey, with rusty surfaces in some parts and holds a few garnets. The bedding is vertical and runs S. 55 degrees W. On several other islands which were visited around the western extremity of the lake, the strike of the grey mica-schist was S. 25 degrees to 30 degrees W. dip north-westward 80 degrees."

"The north-west shore of Cross Lake is formed of Laurentian gneiss, and the channels of the river, soon after leaving the lake, have a rapid descent. Both the geological and the geographical features of this locality therefore bear a strong resemblance to those of the outlets of the Lake of the Woods."



"On the Echimamish, the Huronian rocks were first seen about twelve miles east of the Nelson River, from which point they are continuous to the junction of the White-water, excepting for a short interval, occupied by gneiss between the second dam and the watershed, in which the stream makes a detour to the south and passes beyond the boundary of the Huronian basin."

"Up to the first dam the Huronian rocks consist of glossy grey and greenish grey fine-grained mica-schist in a vertical attitude, the strike varying from W to S. 50 degrees W. At the first dam a very dark-grey quartzite, composed of grains of vitreous quartz mixed with finer silicious particles, is interstratified with thin layers and groups of layers of nearly black clay-slate, and holds bunches of smoky vitreous quartz. It is associated with grey felsite slate. The strike is S. 80 degrees W. and the bedding vertical. Immediately to the south of the dam mica-schists again make their appearance. Close to the Laurentian gneiss, six miles further up the stream, dark-grey slaty quartzite occurs with the same strike as the gneiss, namely S. 75 degrees W."

"About a mile west of the watershed, at Painted Stone, the gneiss gives place to greyish mica schist having a strike varying from S. 60 degrees W. to S. 70 degrees. At the watershed and for a mile down the south side of the eastern section of the Echimamish, the rock is a grey quartzite, strongly ribboned with reddish and lighter grey streaks. The strike is S. 70 degrees W., vertical. Fine-grained greenish-grey mica-schists having the same strike occurs on the opposite side of the channel."

"Beginning about two miles east of the watershed, coarse reddish granite and a gneissoid rock become associated with the mica-schist as far as the junction of the White-water, five miles further."

"As stated in a previous part of this report, Laurentian gneiss was found along the whole course of Franklin's River, the Huronian rocks appearing again on the south shore of Oxford Lake, five miles east of the opening from the Wapinaipinis marsh, which may be considered as the mouth of Franklin's River."

"The junction of the two formations, which appear as usual to be conformable with each other, occurs just where the south-west area opens into the main body of the lake. Here the last of the Laurentian series consists of grey coarse rough-surfaced quartz and mica-rock. The first rock on what is considered to be the Huronian side of the boundary between the two series, consists of highly crystalline dark green hornblende-schist, ribboned with fine lines of white quartz grains."

It is found at the base of the Huronian bands in the region to the north-westward of Lake Superior. This schist is inter-stratified with bands of finely ribboned grey gneiss, which like all the Huronian gneisses I have ever met

"It is identical in character with the hornblende-schist, which is usual with, is slightly calcareous. The strike at this locality is S. 70 degrees W., but on an island about a mile further on our course to Oxford House a fine



grained hornblende runs S. 50 degrees W. At the distance of another mile, a rather massive crystalline diorite was found on one of the larger islands."

"Three miles further we passed through a gap, called the Doorway, in a chain of islands. Here the rock is a grey micaceous slate conglomerate."

"The rock of the islands about three miles south-west of the Seven-Mile Point, or ten miles from Oxford House, consists of a soft, greenish, calcareous mica-schist, with rounded pebbles and grains, mostly of white quartz. Seven-Mile Point is formed of a grey finely micaceous slate conglomerate, in which the pebbles are abundant, well rounded and composed principally of grey-syenite and light-grey quartzite. Chloritic schist with pebbles of syenite and pebbles or patches of compact white and grey quartzite is exposed along the upper part of Trout River, about one mile and a half south-east of Oxford House. The strike varies from N. 55° to 65° W."

"Midway between Oxford and Knee Lakes, soft fine-grained ash-grey and dark iron-grey mica-schist occurs in the bed of the river for a distance of two miles. The stratification is contorted."

#### "AT TROUT FALL,

One mile above Knee Lake, the water pours nearly perpendicularly about ten feet over a rather massive grey argillaceous and finely micaceous quartzite, running N. 30° west, and showing rather indistinct diagonal stratification."

"On the south side of the inlet of Knee Lake, layers of fine-grained magnetic iron are interstratified with grey siliceous and micaceous schists, running about east and west. This ore has a great effect on the compass, even at some distance off. A strong magnetic disturbance was also noticed at about two-thirds of the distance from Oxford Lake, probably due to the same cause. Grey and coarse greenish-grey mica-schists running S. 65 degrees W. were met with around the south-western extremity, or head of Knee Lake. Grey quartzite was found about six miles down the lake, and again at about twelve miles. In a narrow part of the lake, full of islands, between the last distance and "McKay's Rocks," grey mica-schists, generally of a soft nature are largely developed, and strike from S. 45° to 55° W."

"One part of the narrows in the middle of the lake contracts to a few chains, and has a perceptible current passing through it. A small islet in this current and the western shore abreast of it consist of fine-grained magnetic iron in thin layers, interlaminated with others of quartzite and mica-schist. The rock is twisted and corrugated, and breaks with a splintery fracture. The local magnetic attraction is so great in this neighborhood as to render the compass quite useless. A short distance to the southward a coarse crystalline diorite, having a north-and-south strike is exposed."

"The numerous islands in the narrow central part of the lake consist of greenish-grey schists, amongst which hornblendic, argillaceous and micaceous varieties prevail. The strike in the centre of the archipelago is N. 75° to 80° W. The point on the south-east side, fifteen miles from the



outlet, consists of hard, finely crystalline, slaty, green diorite, with calcareous surfaces and joints."

"At a point on the north-west side, six miles from the outlet, the rock is a mica-schist conglomerate. The matrix is fine-grained, dark-grey and hard, while the pebbles and boulders, which are well rounded, consist of grey syenites, the largest of them measuring two feet in diameter. The strike is here S. 80° W."

"Laurentian gneiss, running N. 75° W., makes its appearance on the Jack River, about three miles below the outlet of Knee Lake, and continues thence all along the route to a point six miles below the rock. Between Knee and Swampy Lakes it is very micaceous, and is cut by many veins of coarse light-colored granite."

#### SURFACE GEOLOGY.

"The nature of the superficial deposits and the character of the soil have been referred to in describing the regions explored during the season. The prevalence of a light-colored clay, often constituting a good soil, free from boulders, over such a large region, is a fact of much importance in regard to the future value of this part of the country. This deposit is said to extend over the greater part of the region between the Nelson and the Churchill Rivers, and even beyond the latter."

"As we have seen, however, sandy and barren tracts are not wanting. The lower portions of the clay banks along the Hill, Steele and Hayes Rivers, and also along the lower level of the Nelson River, are composed of a fine kind of drift, in which the clay itself forms the bulk of the mass, boulders being generally absent and pebbles scarce. The stratified clay, which usually forms the upper parts of the banks has a rather lighter color than the drift clay below. In the region lying towards the sea, in which the clay banks occur along the rivers, the country appears to be everywhere nearly level and covered with a monotonous growth of rather small timber consisting chiefly of spruce and tamarac."

"In regard to the source of the materials composing the drift along the above rivers, I found, among the pebbles, besides gneiss, green schists and the unaltered yellowish-grey earthy dolomite, supposed to underlie the country for a hundred miles from York Factory, a large proportion of various rocks of the Manitounuck and Nastapoka groups, with which I was familiar, on the east coast of Hudson's Bay, and which resemble those of the Nipigon series."

"Among the latter occurring in the drift, may be mentioned the very dark grey quartzite with occasional light spots, which, on weathering out, form rounded pits on the surface, the bluish-grey dolomite with concentric, cherty, concretions, similar dolomites, having reddish layers, the blackish slates accompanying the dolomites and quartzites and a peculiar variety of red jasper such as that of Long Island."



"In my report for 1877, I have shewn that on the Eastmain coast, there is evidence proving that

#### THE WATERS OF HUDSON'S BAY ARE RECEDING.

The same phenomenon is manifest in the neighborhood of the mouths of the Nelson and Haye's Rivers. It is said that within the recollection of the generation preceding the present one, the island called Mile Lands, just above the present site of York Factory was submerged at high tide. Now it is a dry island several feet above high-tide mark."

"Hay Island, in the middle of the river, opposite to York Factory, has not yet become overgrown with trees or bushes, although it is now never swept by the ice breaking up when in the spring, and the Hudson's Bay Company stack their hay upon it with perfect safety."

"Four Mile Island has become overgrown with small poplars, while it is evident that at no very distant period, Six-Mile Island formed two islands, which are now covered with full-sized trees, while the old channel between them now supports a growth of tall bushes."

"Further up the river, similar dry channels, more or less ancient, separate former islands from the main shores, and the appearances indicate that the conditions which once existed here, have been removed further down the river."

"It is said that about the beginning of the present century some vessels wintered in Ten-Shilling Creek, which could not now approach its mouth, and an old sketch-map shows a channel connecting Haye's and Nelson Rivers which does not now exist."

"There is no evidence of the sea anywhere encroaching upon the land. On the contrary, the wide open border between the woods and water indicates that the latter is retiring."

"On Beacon Point and the opposite side of Haye's River, in traversing this border from the sea inland, one meets first with sedges and grasses; next come brushes; then small trees, and finally, the full sized timber of the country."

"There is much old drift-wood near the tree-line, which is now apparently never touched by the water. The Indians say that their old goose hunting grounds along the coast to the northward of the mouth of the Nelson River are now deserted by the geese, the water having "dried up."

"The country to the northward of Lake Winnipeg is emphatically a region of lakes. The general character of the district renders it possible for the rock-basins to occupy a large proportion of the whole area. The solidity of the fundamental rocks and the impervious nature of the clay combine to render permanent all the lakes which may have been formed during the later geological history of the region."

"Besides the larger lakes the mixture of land and water in some of the intervening tracts appears to be interminable. The origin of this condition is evidently owing to the glacial force having crossed at greater or less an-



gles, the strike, cleavage or jointing of the rocks. The fact of the deep channel of the long straight stretch of the Nelson River between Sipi-wesk and Split Lakes have been scooped out along the course of a large dyke of decomposing dolerite, has already been noticed. The smaller lakes are generally not deep, and considerable areas of their shallower portions are covered with tall reeds growing from the bottom. The glacial striæ are usually well marked on the rock-surfaces in all parts of the region examined."

"The section of Hill River between Swampy Lake and Brassy Hill, in which small islands are so very numerous, appears to be an exception in this respect. In this part of the river the descent is unusually rapid and the gneiss is much broken up into angular masses of all sizes in a manner not observed in any other locality."

"The general course of the striæ is southwestward, but it is often locally modified by the contour of the rocky surfaces in the neighborhood. The walls of the narrow ravine in the gneiss in which Franklin's River flows for seven miles before entering Pine Lake, are both horizontally striated. Gaps in the continuity of the walls are filled with drift, containing rounded boulders, numbers of which are also perched on the rocks on either side of the ravine. In some localities the glacial scratches cross each other at considerable angles. This is the case especially at The Rock in Hill River and on Sipi-wesk Lake. Wherever the rivers flow in rocky channels, these have apparently been excavated during the glacial period before the deposition of the softer deposits. The streams have sometimes cut down through a considerable depth of drift in order to follow a rocky channel lying beneath. A singular case of this kind occurs on the Nelson River above the Puck-wahagan, where both sides at the edge of the water consist of flat-bedded dolomite with banks of clay above it, and a comparatively deep river channel below the level of the dolomite on either side."

## EXPLORATION OF PARTS OF THE ATTAWAPISHKAT AND ALBANY RIVERS.

(*Bell, Geol. Survey, 1886.*)

In 1886, Dr. Bell explored parts of these rivers. The Albany is the present northern boundary of Ontario. Commencing at an enlargement of the river called Lake St. Joseph—by the Indians, Lake of the Swampy Country

—Dr. Bell went down that river to the Eabamet River, thence into Eabamet Lake, thence into Fishing Lake, thence by a portage into a stream leading into the Attawapishkat.

The country around Lake St. Joseph is level with low, rocky hills in some places. The percentage of cultivable soil is not great. The climate appears sufficiently good for farming. At Osnaburgh House near the east end, potatoes, corn, peas, beans and ordinary garden crops and flowers were in a flourishing condition at the end of July. In former years, cattle were kept at the port and barley was a regular crop. Hay grows luxuriantly, and



pumpkins and melons had frequently ripened. Forest fires had been frequent, but where the lumber had been spared full-sized trees might be seen. As regards relative abundance the trees flourished as follows: White and black spruce, tamarac, aspen, white birch, Banksian pine, rough-barked poplar, balsam, cedar, pigeon cherry, rowan and black ash. The ground or mountain maple which is interesting as an indicator of climate is common and it was traced for a long distance down the Albany. The white spruce and the tamarac are the most important commercially. Cedar is confined principally to the immediate shores of the lake. About 20 spruce logs for sawing into boards were lying at Osnaburgh House. They would average 18 or 20 inches in diameter at the butt. They showed an average of 112 rings, corresponding to that number of years' growth. A tamarac flag pole measuring 18 inches showed 244 rings.

The number of Indians living around Lake St. Joseph is not very great. They live principally upon fish in the summer and rabbits in winter, but these resources are supplemented by geese and ducks in the spring and autumn, and occasionally by larger game, such as caribou and bears at any season. The fishes of the lake comprise white fish, grey trout, sturgeon, pike, pickerel, yellow-barred perch, grey and red suckers besides some smaller species.

The rocks are granite, gneiss, green and grey schists. The prevailing rock are gneisses, but Huronian schists extend between seven and 24 miles from the west end, and are again developed around the eastern extremity. Magnetic iron ore was found lower down the Albany below the Etow-i-ma-mi. Copper pyrites at Eskaquia or Greenbush portage.

The country on either side of the Albany below St. Joseph is generally level, shores rocky or bouldery, but the banks often show gravel, sand, loam, and clay. Wherever a view can be obtained over the country, long slopes or gentle undulations may be seen, the hillsides being covered with old timber or a second growth of aspen and white birch.

At Eabamet River, Dr. Bell's party left the Albany, and proceeded through Eabamet Lake distant one mile from the Albany. Eabamet Lake runs east-south-east.

(*P. 18 g.*)

"Leaving the Albany and following up the lowest section or link in the Eabamet River, a small stream unbroken by rapids, we entered Eabamet Lake at a distance of only about one mile. This sheet of water runs east-south-east and is about eleven miles long by one mile and a half wide and the stream by which we entered it flows out near the middle of the south-western side."

"In the vicinity of the outlet, micaceous gneiss dips S. 80 degrees, E. 45 degrees. About a mile from the upper end of the lake on the same side, ordinary grey gneiss strikes north-westward. On the north-east side, four miles from the upper extremity, a very micaceous grey gneiss, passing into mica-schist, strikes N. 60 degrees W., and dips north-eastward at an angle of 70 degrees. It is cut nearly at right angles to the strike by irregular dykes



of a coarse, light grey granite, with branches following the lamination, holding considerable numbers of grains and small crystals of a green mineral which Mr. Hoffman finds to be apatite."

"From the head of Eabamet Lake, the river is rapid and has an upward north-westerly course of three miles with Round Lake (one mile in diameter) half way, and we then enter Fishing Lake. The rocks between these lakes consist of dark grey compact felsite in very even laminæ and green dioritic schists, interstratified with a grey gneissoid rock, containing a triclinic felspar. The strike is east and west. These rocks are classified with the Huronian."

"Fishing Lake runs north-north-east and is about eight miles long. No fixed rocks are seen on its shores. The rapid stream flowing into the head of Fishing Lake has an upward northerly course of four miles, and flows out of a lake about a mile wide and six miles long, running north-west. Coarse grey gneiss occurs at the outlet of this lake. This point is thirteen miles north of the last gneiss seen near the head of Eabamet Lake, and as the strike of the Huronian rocks above the latter is east and west, the belt to which they belong has a possible width of the above amount, but it probably does not extend more than eight miles north of the head of Eabamet Lake, and it may be connected with the Huronian belt to the south-west, extending along the Albany from near the Etow-i-ma-mi branch to the outlet of Patawonga Lake, a distance of about thirty miles. Continuing northward from the Six-Mile Lake referred to, after ascending another short link of river, less than a mile long, we entered a lake which also measures six miles from south to north, but which has an extreme width of about five miles. The shores of this lake, almost all the way round, consist of boulders and shingle. Gneiss was found in situ at three places in the northern part. The surrounding country is level with the exception of an isolated hill about two miles from the south-west side of the lake, which is conspicuous from the rarity of any inequalities in the surface of the country in this region, no other hills having been seen on our route since leaving Maminiska Lake."

"From the lake last described, we would have reached the Attawapishkat River most easily by crossing the height of land to the north-westward and descending the Martin-drinking River. We afterwards learned that the first portage leading to the stream leaves the western bay of the lake, and not the north-western, where we searched for it in vain."

"Having no guide, we followed the only route we could find—one which left the north-eastern extremity of the lake by a short portage into a tributary lake, four miles long, running in a north-easterly direction. From the head of this lake we crossed the height of land by a portage 880 paces long, and came to a lake one mile long, from which the water flowed north-eastward. The variation of the compass in this vicinity, from my observations, would appear to be less than 1 degree E."



## BOULDER RIVER.

"We descended the small river which has its source in this lake, to the Attawapishkat River, and found the distance, in a straight line, to be about twenty-five miles. The Indians do not navigate this stream, and as they have no name for it, we call it Boulder River, from the very bouldery character both of its bed and the country on either side. Its general course is pretty straight and bears a little east of north-east. It consists of a series of short stretches of dead water, with bouldery rapids between them. At most of these, we were obliged to make portages on account of the small quantity of water flowing among the closely crowded boulders, although the descent might not be great."

"In some cases, however, a clear channel, down which canoes could be run, was formed through the midst of beds of boulders. The formation of these curious channels, which I have observed at bouldery rapids in many of the smaller rivers, north of the great lakes, may be due to the action of frazil or anchor ice in buoying up the boulders, so that they might be rolled or partially floated down the rapids by degrees, from year to year, until the existing channels were formed. We managed to float our canoes down some of the numerous rapids of this river by removing boulders. This process was resorted to whenever it could be done in less time than would be consumed in cutting out a portage-trail, unloading the canoes, carrying over every thing and reloading. But in addition to clearing a considerable number of such channels, we made upwards of thirty complete portages, which required the trails to be cut through the woods in every instance. All these operations entailed a great amount of labor, occupying from the 5th to the 18th of August. Soon after crossing the height of land, I left most of our party to bring on our larger canoes and supplies, and pushed on in a light canoe to the junction of Boulder River with the Attawapishkat, in order to ascertain whether it was possible to reach the latter at all by this route."

"At seven miles before joining the Attawapishkat, Boulder River falls into a lake, three miles long, which the Indians call Sturgeon Lake, from the abundance of this fish to be found in it. While in the act of setting our gill-net, the evening we camped on its shores, a sturgeon, measuring upwards of five feet in length, was caught in it. Below Sturgeon Lake, the river is not so difficult as above, and after having advanced nearly to this lake with a sufficient supply of provisions for the remainder of the season, I sent back Messrs. MacMillan and Murray with two canoemen as already stated, and continued the exploration with the aid of the remaining four voyageurs."

"While the labor of cutting out portages and transporting our supplies was going on, numerous observations for latitude were taken, and I also explored the country for some distance on either side of Boulder River through a considerable part of its course. The surface consists of a series of rounded bouldery ridges of no great height, irregularly disposed, but running generally in a north-easterly and south-westerly direction, with swampy spaces, covered with a deep hummocky growth of sphagnum moss between them.



In some sections, the timber had been burnt off the ridges and dry parts, exposing the naked surface which was then seen to consist of boulders of all sizes and of a variety of kinds, mixed with some gravel and sand, and presenting a sterile and forbidding appearance."

"On the dry ground, the timber consisted of black spruce, tamarac, balsam, aspen and white birch, but on the wet level tracts it was principally black spruce. All the rapids in Boulder River were overhung by thick groves of good-sized white cedar, and the same tree was met with in groups in some of the swamps at a distance from the river. The rough-barked poplar occurs near the stream, but was seldom seen inland. Common varieties of gneiss were noted in a number of places in the bed of Boulder River. There was no regularity in the general strike. Locally, the gneiss ran in various directions, from north-west to south-west."

"Having reached the Attawapishkat River, I left my supplies in charge of one man on an island, half a mile long, which I called Nolin's Island in his honor, and taking the other three men, proceeded to explore the upward course of the stream. Its general direction was found to be about W. by N. At three miles we came to a very steep rapid, with a rise of fifty to sixty feet in about a mile and a quarter, which, for convenience, I called the Long Rapid. Notwithstanding the strength of the current my men poled our canoe all the way up. No rock in situ is seen, but nearly all the boulders which form the bed and shores of Long Rapid are more or less angular, and consist of an indistinctly and coarsely stratified grey syenitic gneiss, consisting of grey felspar, bluish-white quartz and black hornblende. The weathered surfaces are rough and pitted. My barometers showed the head of Long Rapid to be eighty feet above the level of the river at Nolin's Island. A mile further on, a lagoon occurs on either side of the river, I afterwards learned from the Indians of the country that there is a portage from the lagoon on the north side to another channel of the Attawapishkat, nearly as large as the one we were ascending, and which falls into it only thirteen miles, in a straight line below this portage."

"At the next rapid, which is only a short distance above the lagoons, the ascent is fifteen feet. Here the river rushes over and among large angular masses of pinkish-grey granite, consisting of an even mixture of quartz, felspar and mica, with a medium or fine texture. The appearances indicate that this rock exists in place just beneath."

"The finer materials of the drift along this section of the river contain a large proportion of soft, yellowish limestone, but there is besides, a hard, bluish limestone, containing chert, which frequently occurs also as good-sized boulders. In addition to these, among the more noticeable constituents of the drift of this region, may be mentioned the dark grey, finely quartziferous felsite or greywacke, resembling dark sandstone or friable quartzite in appearance, and holding rounded spots of a lighter color weathering into pits of the same form, which is so generally and abundantly diffused in the drift all over the country, to the west and south-west of James' Bay. Hard reddish



and brownish sandstones, impure jaspery iron ores and red jaspers, having the peculiar oolitic structure of those of the manitounuck and animikie series, may also be mentioned among the constituents of the drift along this part of the river."

"Ascending the Attawapishkat from the last-mentioned rapid, we passed a dozen other rapids, alternating with small lake-like expanses, and at eleven miles, in a straight line from Nolin's Island, entered a direct south-westward continuation of the south-west arm of Attawapishkat Lake but three or four feet below its level and separated from it by a short rapid, flowing out of the middle of the south side of the latter. The northern channel of the Attawapishkat River, above referred to, is said to discharge from the eastern extremity of this lake, but this portion was not completely explored. Attawapishkat Lake is, however, about nine miles long. Its inlet is near the west end."

### LAKE LANSDOWNE.

"Still following up the river for three miles from the inlet of the last mentioned lake, in which the rise amounts to only a few feet, we entered the largest sheet of water on the Attawapishkat, but strangely enough the Indians had no definite name for it. I, therefore, proposed to call it Lake Lansdowne, in honor of the Governor-General of the Dominion. As explained in my summary report, it was found to have a length of about thirteen miles from south-east to north-west, and an extreme breadth of about ten miles. Lake Lansdowne is diversified by many beautiful islands, two of which measure about four miles each in length. The bays and points have all a north-east and south-west direction. A large, rounded, but not high hill, covered with second growth deciduous timber was seen in the western part of the lake, near the inlet or mouth of the upward continuation of the Attawapishkat River. The points and islands in the northern part of the lake are higher than elsewhere and have steep, wooded slopes, but they appear to be all composed of drift, and no rock in situ was seen anywhere around the lake. Long narrow moraines or rows of boulders extend south-westward off the extremities of some of the points and islands along the north-east side. Except where forest fires have run, large spruce and tamarac trees and some cedars were observed on the islands and on the mainland near the lake, and also along the river between it and Nolin's Island."

"The mouth of the upper division of the Attawapishkat River, which the Indians described as a wide tranquil stream, is in the south-western bay of the lake. The Martin-drinking River, by which we should have travelled from the second highest of the Eabamet chain of lakes, enters a bay on the south side between the inlet and outlet. On the opposite side of the lake, a brook is reported by the local Indians to enter the first bay northward of the outlet: and by way of this stream, there is said to be a canoe-route to a lake on the Weenisk River, described as being as large as Lake Lansdowne, and called Wa-pi-quai-o Lake. Another canoe-route to the same lake was stated to begin in one of the northern bays of Lake Lansdowne, and a third route,



which, however, strikes the Weenisk River above the lake referred to, was described as beginning in a bay a short distance south-west of the one last mentioned. Wa-pi-quai-o Lake would appear to correspond with "Weenisk" Lake of Arrowsmith's map, as the Indians stated that it receives a large stream from the west and discharges the Weenisk River to the north."

"A triangular island, measuring about a mile and a half on each side, is formed at the outlet of Lake Lansdowne by a small channel north of the main discharge, by which we entered. In the bed of the southern channel, at a mile below the outlet, there is an exposure, at low water, of a grey, friable, "pepper and salt" gneiss with a few reddish grains. The strike is S. 75 degrees W., but the stratification is not conspicuous."

"Below Nolin's Island at the junction of Boulder River, the Attawapishkat flows eastward and is interrupted by three rapids in the first four miles. Its course then forms a semi-circle to the southward, four miles in diameter, and has marshy lagoons on either side. From the most south-easterly of these a trail leads directly to Martin's Falls on the Albany. An intelligent Indian, who had just come from that trading port, informed me that the trail keeps the same bearing all the way, and on plotting it upon the map of my surveys of the two rivers, the position of the post is found to be directly in the line of the trail. The distance is about sixty miles, and the Indians report the country as level and covered with sphagnum. The trail is said to be crossed by five streams flowing into Attawapishkat and only one into the Albany."

"At the termination of the above semi-circle, the channel we have been following joins the north branch from Attawapishkat Lake, the two branches here flowing towards each other from exactly opposite directions and meeting in the same line which bears about N. N. E. and S. S. W. The distance from the southern outlet of the lake to this junction is about twenty miles in a straight line."

"For thirty miles below this junction, the general course of the river is about east, and in this distance, it maintains a pretty uniform character, being alternately swift and rapid with long bends. The banks are of boulder-clay, ice-swept and sloping gently down from the brink to the summer level of the water, the whole height being about thirty feet. The surface of the country on both sides is low and level, as indeed it has been all the way from Lake Lansdowne. Except where the timber has been destroyed by fire, there is a good growth of spruce, tamarac, balsam, poplars and white birch along the banks of the river, but it does not extend far back, the country generally being open sphagnum swamps with small scattered tamarac and black spruce trees."

"Three miles below the junction of the two channels, dark grey hornblende gneiss is exposed on the south side. It is distinctly bedded and strikes N. 50 degrees W. 90 degree. Half a mile further down, grey, strongly banded or ribboned gneiss strikes with regularity, N. 60 degrees W. At a strong rapid, thirteen miles below the junction, a considerable area of fine grained light reddish-grey contorted gneiss is exposed, the general strike of



which is east and west. At nineteen miles below the junction, the river makes an "elbow" to the south-west and receives, at the angle, a large brook from that direction. On the south side, just below this brook, coarse grey gneiss is met with, striking from S. 40 degrees to S. 60 degrees W., but mostly in the latter direction, and dipping to the south-eastward at an angle of 40 degrees. Two and a half miles further down, similar gneiss has an average strike of S. 50 degrees W., with a dip to the south-eastward. Knobs and hummocks of this rock continue in the channel and on the right bank for more than a mile farther. In the last eight miles of the above thirty miles stretch, the river divides itself among numerous alluvial islands, one group of which (ten or twelve in number) is about two miles in breadth."

"Another Indian trail to Martin's Falls leaves the river at the termination of this stretch. The distance is about fifty miles and the country traversed is described as a sphagnum swamp similar to that crossed by the trail to the same post which has been mentioned as leaving the Attawapishkat higher up. The old timber is still standing along the banks in some parts of the above section of the river, but as a rule, the forest consists of a second growth of poplars, white birch, spruce, tamarac and a little balsam. Here, as elsewhere, along this river, much of the timber has been killed by fires within the last few years and only bushes and young trees have yet replaced it. Small black ash trees have been noticed here and there, all the way from Lake Lansdowne to beyond the termination of the present stretch, and white cedars have been of frequent occurrence, except where the ground is unfavorable for their growth."

"At the termination of this thirty miles-stretch, the general course of the Attawapishkat changes to N.N.E. for about sixty miles, or to a latitude 53 degrees 0 min. 0 sec., where a brook falls in from the left or west side. In the first nine miles of this distance, the river divides into two main channels, with several smaller ones, all flowing sluggishly through a level country between low alluvial banks. The place where they come together again, is called Mattawa by the Indians and is a favorite burying place for their dead. From Mattawa the stream again becomes swift and rapid, as it was above these islands, and the banks resume their ice-swept bouldery and clayey character."

"At eight miles below Mattawa we passed the last exposure of archæan rock on the river. At low water it forms a conspicuous island in the middle of the stream and consists of a strongly banded mottled grey gneissoid rock, but is composed of light-colored felspar and black hornblende. The strike is straight and regular N. 5 degrees E. and the dip is eastward at an angle of 45 degrees. It is cut by a dyke of the same composition, ten feet wide, bearing due north, with smaller dykes running in other directions. A dislocation was noted running S. 60 degrees W., towards which the stratification bends in approaching it from either side. Several boulders of a reddish-grey syenite were observed at this locality, which exactly resemble the syenite in the Huronian rocks of Shebandowan Lake."



“Three miles below this rocky island, the river cuts through ridges of bouldery clay, capped with gravel, about 200 feet high, which here appear to run about north and south. From where the river enters these earthy ridges its course is eastward for about four miles, after which it resumes the general north-north-east trend and flows with a swift smooth current, unbroken by rapids, such as are of frequent occurrence in the upper reaches, for twelve miles, between banks from twenty to forty feet high, composed of sandy and pebbly yellowish clay with some boulders.”

“At the foot of an eastern ‘jog’ in the river, about eleven miles further on, or sixteen miles in a straight line from the above mentioned island of gneissoid rock, unaltered limestone is seen in the right bank for the first time in situ. The strata are horizontal and consist partly of compact yellowish drab, rather thin beds, together with a large proportion of porous and rusty looking layers associated with iron-stained yellowish marl. The only fossils observed consist of large fucoids which cover the surfaces of some of the bed. Below this locality, yellowish limestones are exposed almost continuously in the banks or bed of the river, for the next thirty-four miles. They often form cliffs from fifteen to thirty feet high, which are sometimes a mile or two long. Thick layers were observed in a few places, but, as a rule, the beds are thin. The strata appear to the eye to be quite horizontal, except in two localities where very local gentle undulations were observed. The river in this section is wide, shallow and swift.”

“In the above N.N.E. stretch of about sixty miles, the Attawapishkat receives no tributaries from the west that we could detect, except two or three small brooks, and the larger one at its termination, which has already been referred to. But it is joined by a considerable number of branches from the east in the same interval, the largest of which falls in at about forty miles down or eight miles below the first appearance of the horizontal limestone. The latitude of the mouth of this river from the mean of two very closely agreeing observations is 52 degrees 41 min. 11 sec. A party of Indians of the country whom we met here, had no name for this stream, and I propose to call it Streatfield River after the Governor-General’s secretary.”

“Along the upper part of this stretch (of sixty miles) the timber is mostly green, and some of it is of fair size, but throughout the greater part of the distance the woods have been burnt at different periods many years ago, and whether original forest or second growth, the trees are generally of small size. In some parts, spruce and tamarac are mixed with the poplars and white birch, but in others the coniferous and deciduous trees occupy separate areas. The sections of old timber and second-growth alternate at intervals of varying length with others more or less recently burnt and not yet reforested. The white cedar is scarce, but an occasional tree is found in favorable situations much further down the river. The last black ash observed on the Attawapishkat was passed in this section. An Indian from the Wai-nusk River, who was ascending this stretch, and who had never before been so far south, informed us that he had here seen the cedar for the first time in his



life. He had not yet noticed the black ash and had never even heard the Indian name of the tree. The next stretch of the river from the junction of the above mentioned brook, in latitude 53 degrees 0 min., 0 sec., bears E. N. E., and is about thirty miles long, terminating where the stream is joined by a very large branch from the west, called the Muckitat-Michigan or Black Fence River, which, as far as could be seen, has the same general course as the united waters for some distance below. The horizontal limestone is exposed on both sides nearly all along the upper six miles of the stretch under description, but in the remainder of it the banks and bed of the river consist of drift, which is largely made up of the limestone debris. The country on both sides is level throughout this portion of the river. A large brook falls in from the south at six miles above the termination of this section."

"The timber along both banks in the upper twelve mile of this reach consists of old green spruce of fair size, but in the remaining eighteen miles, the green and recently burnt timber alternate in short sections. In some parts the fire was actually burning as we passed by."

"The general course of the Attawapishkat, from the junction of the Black Fence River to its mouth is about S. 70 degrees E., and the distance in a straight line about 135 degrees. The river has now become much larger and it flows for many miles with a swift current between rather low banks of drift, the country on both sides being level. The latter character continues all the way to the sea. From this large branch to the mouth the Attawapishkat is characterized by great numbers of islands. In the upper half of this long reach, only half a dozen tributaries were observed, and scarcely any at all in the lower half, which may be due to the even nature of the surface of the country and its general and uniform slope to the eastward, thus causing the drainage to pass off in parallel lines direct to James' Bay."

"Nineteen miles below the Black Fence River the Missi-sagaigan, or Big Lake River, a good-sized stream falls in from the south, opposite the upper part of an island three miles long. In the sandy banks, above the lower end of this island, marine shells were observed for the first time. The species collected are *Saxicava rugosa*, *Tellina Grænlandica*, *Cardium Islandicum* and *Mya truncata*. The barometric readings would give this locality an elevation of about 500 feet above the sea. Horizontal beds of limestone occur in the bottom of the river, five miles above this point, and again at three miles below it, at the head of an island, which is over six miles long, and may be called Big Island. From the foot of Big Island, the river forms a semi-circle to the south, four miles in diameter, and then it divides into channels, which form four islands, with a total length of six miles. The water is shallow and the descent rapid in these channels, each of which is flanked by cliffs, about twenty feet high, of yellowish crumbling, earthy limestone. This rock, and indeed all the limestones met with so far on this river, resemble those of the Churchill and Kenogami Rivers, which are of Silurian age."

"For the next twenty-three miles, the river flows south-east, and has upwards of twenty islands in this part of its course."



Throughout the above twenty-three miles, the river is generally wide and smooth, with low banks, composed of drift, while flat-bedded limestone is occasionally seen in the bottom. At the end of this distance, however, a sudden change takes place, and for thirty-three miles, or to the head of Lowasky Island (the general course being east) the river flows with a rapid current, between cliffs, and among almost innumerable islands of yellowish limestones, all having an average height of about forty feet. These limestones have a singular structure. They consist of great, spongy and cavernous masses, often occupying the full height of the cliffs, which may be described as gigantic concretions, alternating with thinly-bedded portions, the lamination of which appears bent at all angles, to accommodate itself to the spaces between the concretionary portions. Close to the latter, the lamination often follows the contours of their outlines, but further away it dips at more moderate angles. The islets which are thickly scattered among the larger islands in this part of the river, often appear to consist of single masses of this kind. Their surfaces generally present a massive and very uneven, or rugged appearance, but they sometimes show numerous patches of more or less concentric lines, marking a subordinate or internal, indistinct concretionary arrangement, or the edges of the thin beds, which have remained in basin-like forms in the depressions on their exteriors. Both the massive and laminated varieties have a yellow or yellowish-grey color on fresh fracture, but the old surfaces have weathered to a blue or ash grey."

"At forty-four miles before coming to its mouth, the Attawapishkat divides into two channels. We followed the southern or smaller of them, which is called Lowasky River on Arrowsmith's map, and the island between it and the northern or larger channel, which has the above length (44 miles) may be called Lowasky Island."

"The limestones above described extend for a few miles down the southern branch, and there may be small channels in this neighborhood between the two branches, but in the rest of its course the Lowasky river presented little requiring description. The banks, which are generally low, consist of bouldery clay with stratified gravel or loam occasionally at the top. Numerous shallow rapids occur. The tide extends to the foot of three such rapids, close together, about eleven miles from the mouth. A channel which appeared to be a feeder, but which may be a discharge, occurs at four miles from James' Bay. In the marshes on either side of the mouth of the river, we observed great numbers of geese and ducks as we passed out to sea, on the 7th of September."

"Throughout the long stretch from Black Fence River to the sea, the country on both sides, maintains the same level and swampy character which has been described as prevailing higher up. The timber on the borders of the river, where still green, is smaller along this section than along the upper parts. Some portions, consisting principally of spruce and tamarac, appear to belong to the original forest, but much of it is, no doubt, second growth, and these two species are then usually mixed with poplars and some



small white birch. The growing timber, whether original or second growth, is not often continuous for any great distance, being interrupted nearly the whole way by frequent sections of burnt ground."

"From the barometric readings obtained on Lake Lansdowne this sheet of water would appear to be about 960 feet above the sea, which shows that the general fall in the surface of the country between it and James' Bay must be very gradual indeed. It is a remarkable fact that we did not require to make a single portage in the whole distance from this lake to the sea and I could hear of no portages in the continuation of the river above the lake. The Indians describe the latter as a wide and tranquil stream, expanding into several lakes along its course."

"Sturgeon are abundant in the lakes of the Attawapishkat, and they appear to constitute the principal food of the few Indians who inhabit the country. Whitefish are also caught both in the lakes and along the river itself. Pike and suckers are abundant in all the waters. The Canada goose breeds in considerable numbers in the open swamps behind the wooded borders of the lower section of the river, and the young birds, ready to fly, were congregating in flocks, all along the lower stretch, in the end of August and beginning of September. The dusky and other species of ducks were also numerous, and the yellow-legged plover was very abundant. We saw a few cariboo and several black bears while descending the lower part of the river."

"The Indians of the Attawapishkat and Weenisk districts appear to have diminished greatly in numbers since the last sixty or seventy years. At that time several trading posts were maintained in this territory, where none now exist. We met with only a few families, but a good many Indian graves were noticed along the banks of the river. Those living far up the stream never go to the sea. One old man with whom we talked had never been at any trading post. Few of them had ever seen a white man before. One young man whom we fell in with on Attawapishkat Lake accompanied us up to Lake Lansdowne, and after a few days' acquaintance, I had no difficulty in engaging him to go with us to James' Bay, and thence up the Albany, from which he was to cross by one of the Martin's Falls trails to his own river again."

"After leaving the southern mouth of the Attawapishkat, we reached the Kapushkow River in our canoes in three hours and a half, the distance being only about ten miles. Starting from this river early next morning (8th September), we ran the whole distance to Fort Albany the same day, by sailing and paddling, arriving there late in the evening. The shore of James' Bay between the two rivers is extremely low. The beach along high-water mark is sandy and marshy, but when the tide is out, reefs of boulders and stones, which look interminable, stretch out to sea as far as the eye can reach. The tide had fallen some time before we approached the Albany River, and in order to get past these reefs in our canoes we were obliged to go so far out to sea that the tops of the trees on the nearest part of the shore were barely visible at a few points. Even at high water, it requires an experienced pilot to



take a sail-boat over these extensive bouldery reefs. We were told that the water is so shallow that no large vessel could pass between the west shore of James' Bay and "Agoomska" Island. This large island lies nearer to the west shore of the bay than is represented on the maps, and it is called by the Indians of the region Agimiski or Akimiski.

### RED LAKE AND BERENS RIVER, KEEWATIN.

In 1893, Mr. D. B. Dowling of the Geological Survey, explored the area lying between Lac Seul and the Berens River, a district lying north of the western part of Ontario. The general surface of all this district is described as of a rough, rocky, character with small areas between the ridges of alluvial and glacial deposits. The higher parts of the rocky country show very little covering of drift material of any sort except a few boulders, with sand in the valleys. The formation is Laurentian and Huron. It is sparsely wooded with Banksian pine, spruce, tamarac, birch and poplar. There is an Indian reserve on the upper part of the Berens River. This reserve is fairly well timbered, principally with Banksian pine and spruce. The Indians have been able in building their houses, to obtain timber of a suitable size for the walls and rafters, and spruce of a diameter of 14 inches is fairly plentiful. The Indians were growing potatoes, and some other crops. On Lac Seul, at the mission and trading post, there are several very good gardens in a flourishing condition with all the ordinary vegetables growing very satisfactorily. The sandy tracts are generally wooded by Banksian pine, but in the river valley, and on the heavier land, poplar, birch and spruce are abundant. White and red pine are found in small groves south of Lac Seul and are of good average size for timber. On the lake are scattered trees of both varieties. The northern limit of the Red pine extends to Red Lake where a few trees were observed. Cedar of inferior growth occurs in isolated localities but none was seen within the Berens River district.

### THE EKWAN OR EQUAN RIVER DISTRICT.

The Summary Report of the Geological Survey, for 1901, contains a brief account of an exploration made by D. B. Dowling, of the Equan River, a stream entering James' Bay about 65 miles north of the Albany, the present boundary of Ontario. After detailing his efforts to get from Moose Factory to the mouth of the Equan, against contrary winds, Mr. Dowling says:—

"As the Indians of this district cannot obtain bark to build canoes, they were poorly equipped in this respect, and finding that no canoes could be had, we did not divide our party, but with our two wooden ones began a micrometer survey of the Equan. This was continued for about one hundred and fifty miles from the coast, or to the mouth of Washagami river, which I ascertained to be in latitude 53 degrees 48 minutes 52 seconds. We then ascended this branch to the first lake, from which, by a series of long portages eastward, we reached a small stream that carried us to the south end of Sutton Mill lake.



This we found to be in a deep valley trending north and south, with an average width of little over half a mile. It is divided into two sections by a ridge of rock, consisting of horizontal beds of Cambrian age surmounted by a heavy trap overflow, similar in general appearance to those of Lake Superior. Through this, by a series of parallel faults, a narrow chasm, nearly blocked up by detritus from the cliffs, allows a small stream to flow from the southern to the northern part of the lake. A long-survey of this lake was made."

"As the navigation along the Hudson Bay shore from Trout river was reported difficult and dangerous, we both returned by the routes we had already traversed, arriving from the interior at the mouth of the Equan on August 22. Having but a short time to spend in this vicinity, I determined on making a quick trip northward along the shore as far as the weather would permit. A log-survey, checked by latitude observations, was made as far as the Opinngow river. After being detained here by a storm from the north, and fearing a continuance of bad weather, we turned back on August 30, and arrived at the Equan again on September 3. Hiring our former guide, we started in the boat for Albany, but were detained by head wind at the southern mouth of the Attawapishkat river. A latitude observation which we took here confirms the position determined in 1886 by Dr. R. Bell which was questioned at that time, as it was much farther south than that given on the old maps and charts."

"The Albany River, like the Moose, is divided at its mouth into three channels. The trading establishment and mission are situated on an island on the north side of the southern channel. North of this island is the broad opening called locally North river. This has at its mouth a long bar similar in position to the Ship Sands at Moose. The southern entrance to this is the larger, and its entrance seems to be much deeper than the channel going to the settlement. The small channel north of the bar is shallow at low water and as a bar outside on which we found a depth, at high tide of very little over one fathom. Very shoal water, in which boulders appear, extends northward beyond Nottashay point and boats are obliged to keep nearly out of sight of land to escape the shoals. Chickney river, which enters north of the Albany, is said to be another channel from the latter."

"Shoals were observed, well out from shore to near to Kaypuskow river. In the inner water between Akimiski ('Agoomska') island and the mainland there seems to be a maximum depth of about two fathoms. This shoals gradually to one fathom at a distance of three miles from either shore, as observed in tacking back and forth in latitude 52 degrees 54 minutes 0 seconds. The mainland here is generally without a beach and between the woods and the tide-line is a wide flat covered with grass. The north-western part of Akimiski island approaches the mainland much closer than is shown on the maps and a number of shoals are scattered from this point to the point south of the Equan river. The boat channel, according to our guide, runs to the west of the two islands which here lie off the shore. The position of the



mouth of the Equan river according to several observations is in latitude 53 degrees 14 minutes 0 seconds."

"Northward from the Equan, the shore, for a long distance, is flanked by high gravel bars, but at low tides a broad belt of mud extends out several miles, so that travelling along this coast with canoes is very unpleasant should the time of high water be in the middle of the day or night. Landing on the beach without a long 'carry' through the mud is only possible at high tide."

"The rivers that enter the bay between Equan point and Cape Henrietta Maria are not large and, as the former maps are mere sketches, it is difficult to locate those which are not known by a local Indian name. The first stream north of the Equan is a small channel said to be a branch from that river. It is marked by two gravel bars to the north about a mile from the beach. Swan river, which is perhaps Raft river of the map, enters in latitude 53 degrees 36 minutes. It is in a slight bay or curve in the shore line. In latitude 54 degrees, the shore takes a curve to the west, forming a point and as the tree-line curves to the north-west from here, this is probably Point Mourning, the first wooded point south of Cape Henrietta Maria. Several small streams flow into the above bay. The first is called by the Indians, Nowashe river—the next Patchipawapoko—then the largest along this coast, the Opinnagow, followed by the last stream Nikitowasaki, fifteen miles north of the Opinnagow. The latitude of the mouth of Opinnagow river by observation is 54 degrees 12 minutes 24 seconds."

"The bay to the south of Cape Henrietta Maria is shallow and muddy with wide mud flats, but near the extreme eastern end of the cape, the shore is reported to be bolder and limestone beds are said to outcrop at high tide mark. These are probably continuations of those found on the Equan and Attawapishkat rivers to the south-west."

"The timber along the coast gradually becomes smaller as we go northward and the tree-line recedes from the shore, leaving it finally at the Opinnagow, so that the country behind the cape is more or less an open plain. The shore, where the trees are at a distance from the beach, is generally an even mud slope, covered above high tide with grass, followed by a wide belt of stunted gray willows which look somewhat like the sage bush of the western plains. Behind this, a few isolated spruces of small stature appear before the tree-line is reached. In sailing along this coast, it is impossible to know which way to steer so as to run parallel to the land as nothing is to be seen ahead by which to shape one's course."

"The tides along this narrow shore are not regular in their amount of rise and fall, which is determined, in a great measure, by the direction and strength of the wind. From Equan river northward, the high tide appears to be about six and a half hours after the moon's meridian passage—the flood and ebb running seven and five hours respectively, while to the south of the shallow ground between Akimiski island and the mainland, the flood comes from the south and is much earlier. High tide at Lowasky river occurs at



between two and a half and three hours, and at Albany about the same. The flood tide at Lowasky river runs four hours and the ebb eight. At Albany the flood runs five hours and the ebb seven. At the outer bar at Moose river the tides are from half an hour to an hour earlier."

"The general course of the Equan river, from the junction of the Washagami or Clearwater river is toward the east-south-east. It emerges from a plateau above the mouth of the Little Equan river, in a wide old valley and then flows eastward over a sloping plain to the sea. In the latter part of its course, it is cutting down a new valley through marine clays which cover the underlying rocks to a depth varying from twenty to fifty feet. From the lowest rock exposure to the sea, the current is swift and it is constantly moving a large quantity of gravel towards its mouth and into the bay, into which the stream empties. Shoals and gravel islands at its mouth bear evidence of this transportation. Nearly horizontal limestones are met at intervals in the section which lies between the fortieth and one hundredth mile from the sea. From a series of fossils collected in these rocks, it would appear that they are older than the Devonian and are probably of Silurian age."

"Above the Little Equan, as noted before, the river issues into a wide valley from a higher plateau, but this valley gradually narrows before the Washagami is reached, and cut-banks of clay, higher but somewhat similar to those in the river below, occur at many of the bends. These clays contain marine shells such as *Saxicava rugosa*, *Macoma calcarea*, *Mya truncata* and *Cardium ciliatum*. These were also found at the highest point at which the clays were seen, about 390 feet above tide. The fall in the river from the mouth of the Washagami, as given by our barometer readings, is about 290 feet. North of this to beyond Sutton Mill lake, is a plateau at an elevation of nearly 400 feet above tide, through which, in latitude 54 degrees 20 minutes rounded or oval domes of trap protrude to a height of from fifty to one hundred feet. Through the plateau, a deep narrow valley has been eroded in a north and south direction, which is now occupied by the waters of Sutton Mill lake. At the lake, the surface of the clay plain is 390 feet above the sea and the surface of the water is 290 feet above the same level."

"Soundings show that the bottom of the southern part of the lake is 310 feet below the plain and that of the northern part 250 feet below the same surface. It was known from the map published long ago by Arrowsmith that a tract of high and broken ground (compared with the generally level country) existed to the south-west of Cape Henrietta Maria. This tract has been assumed to be Laurentian and it was so coloured on former geological maps, but in my instructions from Dr. Bell he predicted that the rocks of this area would more likely prove to belong to the same series as those of the Manitou-nuck and Nastapoka islands, on the east side of Hudson Bay, which are of the same age as the Animikie of Lake Superior; and my examinations of the region proved this surmise to be correct."

"Silurian limestone is found on Trout river, draining Sutton Mill lake, as well as in the bed of this lake just north of the trap rocks. The rocks at the



narrows of the lake, described on the maps as 'high and romantic,' are cliffs one hundred and fifty feet in height of trap, capping horizontal beds of probably Animikie age. The trap overflow covers the uneven surface of these rocks, in much the same manner as at Nipigon bay on Lake Superior. The underlying rocks are dark slates impregnated with iron ore and interbanded with beds of jasper. Some of the beds seem to contain a high percentage of magnetite and hematite. On the east shore a section of about ninety feet of these jasper and iron-bearing slates is exposed above the lake, but on the west side they have been brought down to below the water level by a series of north and south faults and the exposures there are of the trap alone. These rocks form an east and west ridge reaching to the upper lakes on the Washagami and eastward to a large lake on a branch of the Trout river which, as before stated, drains Sutton Mill lake and runs to the north."

"The slates and jasper, or jaspilite, beds form a long anticline, whose axis runs east-and-west and the majority of the beds exposed belong to the northern slope of the anticline. This ridge is terminated on the lake by a series of north-and-south faults with downthrow to the west of unknown amount. The overflow of trap appears to have been at a later date, as there seems to be some unconformity at the base of the trap, the flow having filled all the inequalities in the underlying surface. The cliff at the west side of the narrows is of trap, one hundred and fifty feet high, with none of the jaspilites showing beneath it. On the east side, however, ninety feet of these beds are exposed with a varying thickness of trap above them."

"The following rough enumeration of the arrangement of the beds below the trap is given, but as no careful examination of the rocks has been made, it is to be considered as only provisional."

"At the top, in contact with the under surface of the trap, is a series of black, gray, and greenish slates with many of the upper beds impregnated with magnetite. At eighteen feet down, red jasper streaks begin to appear and the first narrow band is quite crystalline, so much so, that it resembles an eruptive porphyry. In the next two feet, very thin beds or streaks of jasper are interleaved with the slates, but they become much thicker below. The jasper beds are seen to be made up of minute oval and rounded concretions of bright jasper separated by a matrix of chalcedonic quartz. As the colour depends on the percentage of these jasper pellets the colour of the beds ranges from light-red to brown. Thin bedded dark rusty rocks form the majority of the beds to about thirty feet down, where several heavy beds of jasper occur. Below this to forty feet, the beds are mostly of dark grayish and black semi-crystalline rocks with fewer red streaks, but they are more heavily charged with magnetite than those above, and some of the thin beds appear to be wholly of magnetite. A covering of talus conceals the slope to about seventy feet down, but, in this space, fragments which lie about, indicate dark iron-bearing slates or quartzites of high specific gravity. In the lower part of the section, the rocks are of a coarser crystalline appearance and the lowest bed, or that exposed at the water level, is heavy with magnetite."



"The valley of Sutton Mill lake widens out at the north and its discharge flows at first in an old wide valley and then gradually forms a newer channel for itself. In going north, the timber gets small and disappears before the shore of Hudson bay is reached. The mouth of this river is placed by several latitude observations by Mr. Boyd at 55 degrees 16 minutes 9 seconds."

"Along the streams there is a narrow fringe of timber, but in approaching the tree-limit this becomes very small. Back from the immediate slopes of the river the surface is nearly level and moss-covered, with scattered groups of small spruce and tamarac. The greater part of the interior is reported to be muskeg (open bog). A small collection of about forty species of shore plants was made at the mouths of the Equan and Albany rivers."

"The principal fur-bearing animals of this district are foxes, otters and beavers. Of the larger mammals, few appear to be obtained by the Indians. In the interior the game birds are all very scarce, the fall hunt for ducks and geese being confined to the shores of the bay. The rivers afford a small supply of whitefish. The streams running to the north into Hudson bay in this region are, at certain seasons, well stocked with speckled trout. Sutton Mill lake is well supplied with a slender variety of lake trout and at the narrows, speckled trout were also caught."

## RECONNOISSANCE SURVEYS OF THE KAPISKAN, ATIKAMEG AND OTADAONANIS RIVERS, JAMES BAY.

The Summary Report of the Geological Survey for 1902 contains report of a survey of the country lying between Attawapishkat (Norkat) and Albany Rivers made by Mr. W. J. Wilson in the summer of that year. The Kapiskau enters James' Bay about 35 miles above the Albany. Mr. Wilson says:—

"The Kapiskau is about a quarter of a mile wide for some distance from the mouth and has a width of from seven to ten chains to the forks. At forty miles up, a section was made which showed that the volume of water at this point was 566,000 cubic feet per minute (4 July). The middle is seven chains with an additional three chains for ordinary high water, and the greatest depth is eight feet. The current is swift and strong with frequent rapids which become more numerous as the river is ascended up to 212 miles. Then for a distance of twenty miles there are only a few rapids and moderate current, followed by thirty miles of swift water and rapids. Above this there is almost still water to the Kapiskau lakes and for some distance beyond. The fall in a few rapids amounts to three or four feet, but for the most part it does not exceed one foot, and many of them are mere ripples which I presume disappear in high water. In the whole distance travelled on this river, we did not require to make a single portage."

"The river has no distinct valley, but has cut its way into the thick clay covering that overlies the solid rock or into the soft rock itself. The banks are generally low, rising from five to twenty feet, and usually the land along the river for four or five chains back is higher than that farther away. The



sediment deposited by the river when it is swollen by the spring freshets has accumulated year after year and has slowly built up a ridge close to the stream. It is also possible that the ice may have assisted in piling up the material along the banks in the same way that the shooting dykes are formed along the rivers in eastern New Brunswick and Prince Edward Island. This narrow ridge is well wooded where not burned, with large spruce, poplar, and at some distance from the coast, canoe-birch, fir, balm of Gilead and an occasional tamarac and cedar. The tamarac here has escaped the ravages of the larva of the imported larch sawfly that has done so much damage to it farther south, so that where it does occur it is green and healthy. Back from the river five, or six chains, the trees are much smaller and in many places nothing is seen but muskeg thinly covered with stunted spruce and tamarac two to eight inches in diameter, and an abundance of laurel (*Kalmia angustifolia*) and Labrador tea (*Ledum latifolium*)."

"For the first 125 miles the banks are composed of bouldery clayey and stratified clay and sand containing marine shells. At this distance the first rock exposures appear. The rock is a very soft reddish-brown argillaceous limestone mottled with greenish-gray spots and some layers are wholly of the latter colour. In places layers of the two colonies alternate. The beds as far as observed are horizontal. Near the surface where the rock is exposed to the weather it is broken up into small pieces, and when wet very readily changes into mud, but in digging down much larger and firmer masses are found. The rock where first seen and for several miles up the river, is so soft that the river banks are worn down just the same as clay banks, and no cliffs are seen. This continues up for more than fifty miles from the first exposure, when a considerable change takes place. At the 183rd mile of the micrometer survey a cliff nearly thirty feet high occurs, a section of which is as follows in descending order:—

|   | Feet.       |
|---|-------------|
| Grayish limestone in angular blocks, firm .....                 | 3.0         |
| " " " " much broken, soft .....                                 | 1.6         |
| " " " " slightly mottled with red ...                           | 1.3         |
| " " " " very soft .....   | 0.6         |
| " " " " mottled with red, fairly firm ..                        | 1.5         |
| " " " " very soft .....   | 0.7         |
| " " " " mottled with red .....                                  | 1.3         |
| Grayish and reddish limestone, very finely broken .....         | 0.4         |
| Reddish limestone, mottled with gray .....                      | 1.8         |
| Grayish limestone, very soft .....                              | 0.2         |
| Reddish limestone, crumbling .....                              | 1.2         |
| Grayish limestone, firm .....                                   | 1.0         |
| Mottled reddish and grayish limestone, very soft .....          | 1.3         |
| " " " " " " firm .....  | 1.1         |
| " " " " " " washed and covered by the river at high water ..... | 10.1        |
|   | <hr/> 23.10 |

"For twenty-two miles above the point where this section was made occasional outcrops of similar rocks are exposed along the banks, but for the last ten miles they are considerably firmer and of a light yellowish or buff colour. This is well seen at the last micrometer station, 200 miles from the coast.



Only one more exposure of rock was seen and that was about five miles farther up the stream, or 205 miles from the bay. These distances are given from the micrometer survey and of course follow all the bends of the river, and this makes the distance much greater than if measured in a straight line. No fossils were found in any of these rocks but in their lithological characters they resemble very closely the Devonian rocks at the Sextant rapids, Abitibi river, where there are bands of the reddish and grayish rocks which both in the ledge and in hand specimens are identical with those on the Kapiskau river. The rocks on the Abitibi underlie beds containing typical Devonian fossils."

"For 175 miles up the Kapiskau river the country is as flat as it can be and not the slightest elevation is apparent. At the end of this distance, however the character of the country somewhat changes and for the next 25 or 30 miles up the monotony is relieved by low hills 75 feet high which give a rolling aspect to the country. These hills are evidently formed by erosion and are comparatively level on the top. This area is drier as the soil contains much sand and is covered for the most part with a thick second growth of poplar and canoe-birch with many dry trunks of trees standing or lying scattered over the ground. Going west up the river, the land again becomes flat and the current is not so swift or the rapids so numerous, and at 260 miles the stream becomes much broader and forms a lake-like expansion of comparatively still water for six miles, when it opens out into a small shallow lake. This lake is only one mile long and half a mile wide, but is of some importance as it gives the name to the river. When approaching this lake in a canoe there is no channel or passage visible as it is filled with tall scouring-rushes (*equisetum*) and the canoe has to be forced through these across the lake. The word Kapiskau means obstructed or blocked up and was first applied to this lake and afterwards to the river. For the next mile the river flows from the north-west in a sluggish broad stream with marshy banks, and again expands into a narrow lake running north and south for three miles. At the extreme north end, the river enters and for four miles is almost dead water, after which it has a swift current with occasional rapids as far as it was followed, a distance of seven and half miles from the lake. At the point where I turned back the river was from 30 to 40 feet wide and in places four feet deep, while in other places there was not enough water to float a canoe. It was blocked every few chains with log jams and fallen trees which reach from bank to bank. We had to cut our way through these and this made progress so slow that I decided to return, having first climbed a tree which gave a view of the country for a long distance and nothing could be seen but a broad plain covered with ragged bush with an occasional clump of large green trees mostly spruce, poplar and tamarac, but the area within a radius of five or six miles that is so covered in any one place is small. A small stream enters the largest of the Kapiskau lakes from the west but it proved to be full of boulders, driftwood and rapids so that it could not be navigated by canoes for more than a mile."



"Half a mile west of the south end of the lake there is a ridge which, though only 75 feet above the level of the lake stands out prominently from the level country. An examination showed that it is composed chiefly of gravel. It has the form of a kame and is about 20 chains long and 500 feet wide. It is sparsely covered with Banksian pine, canoe-birch and poplar. Viewed from this elevation the whole surrounding country is a vast plain. The only rise to break the monotony is a slight elevation five or six miles to the north. There is a small lake a mile to the south and peaty swamps are common. These are covered with small spruce and tamarac, and the drier ground with second growth poplar and canoe-birch. The aneroid readings give an elevation of about 400 feet above the sea level at these lakes."

"Large areas are covered by peat bogs, especially along the upper stretches of the river and often the top layer along the almost perpendicular bank is composed of peat four or five feet thick."

"On my way down the river I examined some of the larger branches for seven or eight miles up and found the country in no way different from that adjacent to the main stream."

#### THE ATIKAMEG RIVER.

"Mr. O'Sullivan reports that the Atikameg river, which he surveyed for 135 miles from the forks, presents the same characters as the main stream. There is a swift current and numerous rapids, and the upper part is very crooked with many short bends. The banks are composed of bedded and boulder clays and are from ten to twenty-five feet high. The forest growth, close to the river, consists of spruce, poplar, tamarac, canoe-birch and fir. The spruce averages from six to twelve inches, with occasional trees twenty inches or more in diameter. Back five or six chains, from the river banks, the land is open swamp and muskeg, covered with small spruce and tamarac. No rock exposures were seen on the lower part of this river. The first rock in place is 100 miles from the forks and is a flat-lying, honeycombed light yellowish dolomitic limestone. Some of the cavities are partly filled with a white mineral, which on exposure to the air crumbles into powder. Some of the layers are harder and have fewer cavities. A rock of this character is seen one mile and three-quarters farther up the river. Four miles and a half above this, the soft, grayish limestone, already mentioned as occurring on the main branch, was observed. Rocks similar in character to those seen at these three places occur at intervals almost as far as the river was examined. The specimens collected show that some of the strata are much harder than those of the Kapiskau river. Where Mr. O'Sullivan turned back, the aneroid gave an approximate elevation of 375 feet."

#### THE OTADAONANIS RIVER.

"At high water this branch is navigable for canoes almost to its source and forms a canoe route to the Albany river, by a portage connecting its head waters with the latter."



"It is two and half chains wide at the mouth and I was able to ascend it forty-five miles, though the water was comparatively low. Its general course is north-east and it runs close to the main river as well as to its principal branch, the Atikameg. The banks are composed of clay containing the usual boulders and shells. No rock exposures were seen, but small heaps of the reddish and grayish mottled limestone were lying on the banks as if deposited there by melting ice pans, and indicate that the rock is probably in place farther up the stream."

"The clays exposed along the banks of the Kapiskau and its branches show considerable variety. Near the coast an unctuous bluish-gray clay is overlaid by ordinary sandy clay. Farther up the river, typical boulder clay full of striated boulders occupies the lower part, with more or less stratified material on top. There is no sharp line of separation between them, as they seem to merge into each other. In places there are thin bands of peaty material containing plant remains. Still farther up the banks are higher and the material much more sandy and gravelly, often showing false bedding. Generally the upper layers contain marine shells with few boulders, while the lower part is decidedly bouldery. Thinly laminated limestone concretions are common, usually circular in form, but as far as examined they contain no fossils. For 125 miles up the river there is no means of estimating the exact thickness of the clay covering, but above this, where it rests upon the solid rock, it varies from ten to seventy-five feet. A section six miles above the forks gives, in descending order:—

|                      |          |
|----------------------|----------|
| Stratified Clay..... | 10 feet. |
| Bouldery " .....     | 20 "     |

"The boulder clay is very much like the overlying stratified clay in general appearance, and is of a dark slate colour, but shows no stratification and contains no fossils."

"Limestone fragments, both rounded and angular, are common in the clay; also a dark, very fine grained Argillaceous arkose or graywacke with spheroidal pseudo-concretions of a lighter colour, which by differential weathering are sharply outlined. The cavities thus formed vary in size from mere specks to six inches or more in diameter. In section, examined by Mr. O. E. LeRoy of this office, the pseudo-concretion is seen to consist of angular and rounded fragments of clear quartz and turbid feldspar, shreds of biotite, muscovite and brown sphene imbedded in a matrix of calcite. The centre of the area is occupied by an oval-shaped fragment of fine clay slate. No concentric structure is apparent. The main mass of the rock differs in having a clay or kaolin matrix. These boulders are the most widely distributed and probably the most numerous of all the boulders in the drift, and are found on the west coast of James bay and all the rivers examined in this vicinity. Dr. Bell states that they extend all the way south to Lake Superior and that the rock is found in place on Long island, off Cape Jones, on the East Main coast. Besides these there are well rounded boulders of red and gray granite, gneiss, reddish conglomerate containing jasper pebbles, greenish breccia containing pyrite; banded jasper, jaspilite, several iron ores of low grade;



hornblende schists; diorites, etc. Some of the jaspery iron ores are identical, as far as can be judged from hand specimens, with those collected by Dr. Bell and Mr. A. P. Low on the east coast of Hudson bay, and they also resemble very closely iron ores found in situ on Sutton Mill lake by Mr. D. B. Dowling."

"The shells, etc., found in the clays of the Kapiskau river as determined by Dr. J. F. Whiteaves, are as follows:—*Saxicava rugosa*, *Macoma calcarea*, *M. Balthica*, *Cardium ciliatum*, *Mya truncata*, *M. arenaria*, *Leda buccata*, *Mytilus edulis*, *Seripes Groenlandicus* and *Balanus crenatus*. The shells of *Saxicava rugosa* are very large, one specimen measuring one and seven tenths inches in length, and three-quarters of an inch in width. The first two in the above list are by far the most common and are found everywhere. No striae were observed except on boulders as the soft rock where exposed had weathered and disintegrated."

#### JAMES BAY.

"The most noticeable feature of the west coast of James bay is its extreme flatness. Looked at from a distance there is no distinct shore line but the water and land seem to merge into each other. A strip varying in width from one to three miles and partly covered with grass and low shrubs, extends along the coast from the Kapiskau to the Moose river, except for a few miles north and south of Cockispenny point where the shore is fairly high and dry and the trees come to the water's edge."

#### CLIMATE AND GAME.

"During the months of July and August while working on the Kapiskau and Kwataboahegan rivers the weather was usually fine with warm days and cool nights. The temperature in the early morning averaged about 50 degrees and in the middle of the day 70 to 80 degrees. Thunderstorms preceded by violent gales were rather frequent. Vegetation along the rivers was very rapid and luxuriant."

"Game was not plentiful on the Kapiskau and Kwataboahegan rivers, the few Indians who were there, living wholly on fish and rabbits. The only animals we saw in this district were two bears, three deer, a lynx, and two otters, although the Indians hunt beaver, fox, marten, mink, muskrat and weasel. A few ruffed grouse and an occasional flock of ducks and geese were seen, and the tracks of one or two moose. The Indians report that this animal is steadily moving farther north. Pike, pickerel and whitefish are found in the rivers in limited quantity and the last is caught in the bay along the coast. Sturgeon are caught in the Abitibi river, two of which I saw near Singed Martin creek."

#### THE WINISK DISTRICT.

In the Summary Report of the Geological Survey for 1903, an account is given of a geological examination and survey of the Winisk River which



flows into the west side of the Hudson Bay in latitude 55 degrees 25 minutes, about three degrees north of the Albany River. The explorer was Mr. Wm. McInnes. He went in from Dinorwic station on the C. P. R. west of Lake Superior, following the route of Dr. Bell in 1886. Mr. McInnes mentions that while descending St. Joseph or Osnaburgh lake on June 13 the swamps adjoining the lake were found only partially thawed out and the minimum thermometer recorded 22 degrees Fahr. on the night of the 12th, the maximum reaching 64 degrees during the day and rising to 72 degrees on the 15th. At Fort Hope Post, Eabemet Lake, on the route between the Albany and the Attawapishkat, an Anglican Missionary, Rev. Mr. Richards, cultivates a small garden. Lumber for building was being whip-sawed into deals measuring 12 inches by 2 by 20 feet from white spruce growing plentifully around the lake. Mr. McInnes goes on:—

"In order to reach the Winisk river, the route northwards from Cabemet lake, taken by Dr. Bell on his trip to the Attawapishkat river in 1886, was followed. At Machawaian lake, Dr. Bell's course was left and the more direct route, missed by him, and leading directly to Lansdowne or Attawapishkat lake was taken. Ascending a small stream flowing into the western bay of Machawaian lake and crossing two small lakes, the route leads over the divide between the Attawapishkat and Albany rivers by a portage 74 chains in length traversing a muskeg or swamp with occasional ridges of transported gravel and boulders. Manitush (leech) lake, at the north end of the portage, is two miles long and discharges southerly by a small stream, barely navigable by canoes, into Martin-drinking river. Four portages are made on this stream before reaching Wintawanan lake, into the south-west bay of which Mud river flows from the west. A well travelled Indian canoe-route leads up this stream by a series of large lakes to the head waters of the Attawapishkat river and to the foot of Lake St. Joseph. The Martin-drinking river though not large, is navigable by canoes (with a few portages) to its mouth in one of the southern bays of Lansdowne Lake."

"The country traversed between the Albany and the Attawapishkat is a high rolling plain, rising in the centre about 1,000 feet above the sea and sloping gradually to the north and south. It is characterized by large areas of muskeg, out of which rise low ridges of gneiss and also of sand and gravel. West of Machawaian lake a much higher and more broken country is seen. This, the Indians say, extends westerly, parallel with the upper course of the Albany, for a considerable distance, is well drained and has high hills and larger timber."

"From the north-easterly bay of Attawapishkat lake, a small tributary brook, with three small lakes along its course, was ascended to the divide, across which a portage leads to the head waters of the Wabitem river, flowing into Weibikwei lake on the Winisk river. For 13 miles north of Attawapishkat lake no exposures of rock *in situ* were seen, the country being, for the most part, covered by sand and gravel, rising in ridges 80 to 100 feet above the level of the lakes, and with smaller areas of muskeg between. A ridge of slightly schistose, hard, chloritic diorite, specked with iron pyrites and



striking east and west, is the first rock seen *in situ*. As the last exposure of biotite-gneiss seen was on Attawapishkat lake, 20 miles to the south, and the first to the north occurs on Mistassin lake, six miles to the north, the Huronian belt may be of any width within the limits thus set. Between Mistassin and Weibikwei lakes the gneiss has generally a stratiform character and lies at low angles, often nearly horizontal, the typical rock being a rather hard, red, banded, biotite-gneiss, cut by a coarse white pegmatite-like rock."

"The dryer parts along this route have everywhere been burned over and are now covered with a second growth of Banksian pine, white birch, poplar, spruce and tamarac. The two last mentioned occur exclusively in the muskeg areas."

"The distance from Fort Hope to the head of the Attawapishkat lake, by the course followed, is about 70 miles, and thence to the foot of Weibikwei lake is about 65 miles. Weibikwei lake has an extreme length of seventeen miles and is eleven miles wide. Nowhere in its whole area, however, is there a large expanse of open water, as it is made up of several north and south channels, usually not more than half a mile wide, and about 30 feet deep, lying between long low islands of drift. The land about the lake is depressed and the islands merely low ridges of sand, gravel and boulders lying on a substratum of boulder clay."

"Forest fires have swept the main land excepting in a few places, where spruces remain. Many of these are 12 inches in diameter with trunks of 30 feet clear of branches. Tamaracs and Banksian pines of good size are found in the unburnt areas and cedars of small size fringe the shore. Sturgeon and whitefish are caught in considerable numbers by the Indians, together with speckled trout, doré (or pickerel), and pike. No gray trout occur in the lake."

"The Winisk river passes through the northern end of the lake, flowing into the north-west bay and discharging from the extreme north end. Just below the first rapid a channel that diverges from the river about 15 miles above the lake, rejoins it. This channel carries more than half the water of the united stream. The last white cedars were seen at the north end of the lake, and the last Banksian pine about half way down its western side, and some distance to the south of the lake the last black birch, mountain ash or rowan, and mountain maple were passed."

"The Winisk, for the first eight miles below Weibikwei lake, flows in a succession of rapids over flat-lying ledges of biotite gneiss. The Winiskisis (Little Winisk) leaves the main river at this point and flows off towards the north-east to rejoin it seventy miles below, forming an island of that length and fifteen or more miles in width. Thirteen miles below the head of this island, another channel, the Tabasokwia, splits off the western side and flows around an island about twenty-three miles long by twelve or more in width."

"The descent of the river for the upper 45 miles of its course below the lake is about 7 feet to the mile, with a vertical fall at only one place near the foot, where the Boskineig (smoky) fall has a sheer drop of about 15 feet. Ex-



peaces of biotite granite-gneiss, striking north-westerly, occur frequently all along this part of the river."

"The country on both sides of the stream is low and flat, the immediate banks rising only a few feet above the surface of the water and gradually ascending to a general level not more than 50 feet above the bed of the river. The brulé of Weibikwei lake continues and the trees on both sides are a second growth of about thirty years."

"The low bosses of gneiss are all well glaciated in a general direction varying from south to south-west, with here and there, striæ that are probably later, having a direction of about south-east. Below Boshkeneig fall, the banks become higher, the river flowing in a channel 8 to 10 chains wide between nearly vertical banks of till or boulder-clay. The first pleistocene marine clays containing fossil shells (*Saxicava rugosa*) were found at this point, though stratified clays of similar character were noted for about 10 miles further south. The elevation is estimated to be about 350 feet above the sea."

"Occasional outcrops of gneiss are seen at intervals for 15 miles further, below which point there are no exposures until the limestones of the Hudson bay basin are reached, 140 miles below."

"At no place in this distance has the bed of the river been worn down to the solid rock, the great mass of boulders washed out from the thick mantle of till probably affording the necessary protection."

"The old brulé, noted above, extends only to the last ridge of gneiss. The character of the banks and of the neighboring country is very uniform. The banks consist of an exceedingly tough, impervious boulder-clay that holds up the water and creates behind the narrow belts of trees along the immediate banks (that are drained into the river valley) a great, level plateau-like country, practically without drainage and consequently moss-covered to a great depth, and supporting a stunted and deformed growth of black spruce and tamarac."

"Tabasokwia branch rejoins the main river from the west 68 miles below Weibikwei lake and the Winiskisis from the east, at 77 miles. The first tributaries of importance are the Asheweigkaegen and the Atikameg, flowing from the south-west and south-east respectively, into an island-studded expansion about a mile wide, 94 miles from the lake. The former of these, which is slightly the larger, the West Winisk of the maps, is one chain wide and from 2 to 5 feet deep, with a moderate current of about 2 miles an hour."

"The last balsam firs were seen here and the last white birches 10 miles down. The average width of the river is now about a quarter of a mile and the banks rise about 45 feet above it; the country extending far to the east and west of the stream is a flat, moss-covered plateau with small spruces and tamaracs scattered upon its surface."

"At 126 miles the river, which to this point, with a slight bend easterly, and then westerly, has kept a northerly trend, turns off abruptly to the east and keeps that course, inclining slightly to the south for 70 miles. Near the



elbow, two large brooks come in from the west, the Panipatowanga and the Pikwakwud. By the lower stream there is a canoe route to the Fawn branch of the Severn river. Twenty miles further on, a large brook, known as the Winoni-micheken, or fat-wier river, comes in from the north. At 9 miles below this, the river divides around an island six miles in length known as Atik-minis."

"The banks have been gradually increasing in height, and are here about 50 feet above the river. They still preserve the same character, presenting above high water level almost sheer walls of boulder-clay. This clay can be readily recognized as of two ages—a lower, exceedingly tough, compact till, with a great number of large boulders, and an upper, more friable, buff-coloured clay, with small pebbles and only an occasional large boulder. Marine clays of varying thickness cap these banks all along and yield many species of fossil shells."

"The first rocks of the Hudson Bay sedimentary series are seen at 194 miles from the lake or 42 from the coast. They occur as flat-lying, fine-grained, somewhat arenaceous limestones, forming the bed of the river. Four miles below, the river breaks through a gorge of these rocks, affording a section of about 30 feet of limestones and dolomites."

"Fossils collected from the limestones are found by Dr. Whiteaves to be similar to those of the Fawn branch of the Severn and of the Attawapishkat and Ekwan rivers and therefore Silurian. The strata occur in a succession of gentle minor undulations, but they preserve a general dip that accords closely with the slope of the river-bed, so that it is estimated that only about 70 feet in all of strata are exposed along the stream."

"At a point 26 miles from the mouth of the river, a compound anticlinal, whose axis strikes south 70 degrees east, brings up the upper beds of a lower set of rocks, consisting of quartzites and slates, that apparently underlie the limestones unconformably. The trend of the anticlinal would carry it easterly to Sutton Mill lake, where rocks of the Nastapoka series were noted by Mr. Dowling in 1901, and it seems not unlikely that these Winisk beds may belong to the same series."

"Below the point at which these rocks occur and nearly to the mouth, frequent exposures of nearly horizontal beds of limestone are seen forming low cliffs underlying the boulder clay. Along this part of its course, the river is about 30 chains wide, expanding in numerous places to three-quarters of a mile, with many islands."

"The boulder-clay banks rise to 85 feet above the level of the water, with the same irregular layer of marine clay on top, the whole capped, where fresh sections are afforded, by from 6 to 10 feet of sphagnum moss that shows very little evidence of decay. Back from the banks, the same moss-covered plain, with scattered spruces and tamaracs, extends for long distances, probably to the next river valleys on either side."

"Sections of trees growing along the river showed a very small annual growth. A black spruce 10 inches in diameter was found to have 270 rings



of annual growth and one 6 inches in diameter 110 rings. Two 12-inch trees growing on a dry knoll showed 120 and 148 rings, respectively."

"Twenty-four miles from the mouth, a river of considerable volume comes in from the east, by which there is a route to the Ekwan river. It is known to the Indians as the Mattawa. The Mishamattawa, 10 miles further down on the west side, is used as a canoe-route to the mouth of the Severn river, by way of the Shakemeh river and the coast of Hudson bay."

"For 25 miles up from the sea, the river has an average width of about three-quarters of a mile, increasing to over a mile in places and is dotted with a continuous line of islands. These islands support a growth of large spruces, down to within twelve miles of the mouth. Below this, they are covered with grasses and small bushes, with only an occasional grove of large balsam poplars. On the mainland there is the same stunted forest down to within three miles of the sea. A level, sandy, treeless plain, sparsely covered with grasses and various other plants, forms a fringe along the coast."

"For the final 40 miles, the general course of the river is north-east. The eastern shore then bends eastward to form the coast line of the bay, and the west shore takes a course almost directly north for 8 miles to Wabukwin-niashi or White-bear point, whence the coast trends westward. The estuary and neighboring ports of Hudson bay are quite shallow. The receding tides though having a fall of only about 6 feet, leave a wide margin of mud flats, studded with large boulders."

"The only buildings at the mouth of the river are a small log shanty that serves as a winter outpost for the Hudson's Bay Company, and a very creditable frame church built by the Roman Catholic mission at Albany, from lumber cut by whip-saws on the spot."

"Tamarac trees along the river were suffering from the depredations of a dark green worm that Dr. James Fletcher identifies from description as larva of the imported larch saw-fly (*Nematus Erichsonii*) that has been gradually spreading over north-eastern America. The trees were found to be slightly attacked about the mouth of the river on the 1st of August, the defoliation gradually increasing up river to the Tashka rapid, 192 miles from the mouth, where they were quite stripped of needles on August 13 and gradually decreasing again southwards. The trees about Weibikwei lake were quite untouched on the 21st of August."

"The total length of the Winisk river from Weibikwei lake to the sea is about 240 miles and its probable length above the lake over 100 miles. The descent from Weibikwei lake is in the neighborhood of 700 feet."

"The average morning and evening temperature on the river between the middle of July and the 22nd of August was 57 degrees Fahr. and the average noon temperature 69 degrees Fahr. There was no frost until the night of the 22nd August and none of any severity till the 3rd of September, when ice was formed on standing water."

"The Canada grouse or "spruce partridge," ducks of many species and various waders breed along the river and a few flocks of wild geese were seen.



Moose are not found beyond the southern end of Weibikwei lake, in north latitude 52 degrees 52 minutes. Caribou range over the whole district. Black bears are fairly plentiful and white bears occasionally come ashore from the drift ice at White-bear point. The common fur-bearing animals occur, though beaver and otter are not plentiful. White foxes were taken last winter as far south as Lake St. Joseph."

"At the mouth of the Winisk, the Indians were taking white-fish and brook trout of good size in large quantities. Further up on the river, white-fish were seen in large schools, and sturgeon, doré, pike and suckers were also caught. The Indians throughout this district are fish-eaters, depending for subsistence largely upon their nets and mécheken or trap-weirs which they build with great skill, fencing off the smaller rivers and impounding all fish coming down the current."

"The 500 Indians trading at Fort Hope, as well as those scattered along the river and its tributaries, are for the most part christianized. They are divided about equally between the Anglicans and the Roman Catholics, the latter reaching the Indians by periodic visitations from the Mission at Albany, while the former maintain a resident clergyman at Fort Hope."

"Over the whole country examined, evidence of glacial action are plain, and wherever the direction of movement is indicated it is, in a general way, southerly. The transported material clearly shows, too, by its composition, a northerly origin. From Weibikwei lake for 55 miles down the Winisk river, the course of the glacial striæ is about S. 30 degrees W. with occasionally a set running S. 15 degrees E. On the Wabitotem river, the movement was S. 40 degrees W. Along the Albany river, between Fort Hope and the Opichewan, the striæ have a very regular direction, S. 68 degrees W."

"The volume of water carried by the Winisk, computed from two sections across the bed of the river, made about 30 miles from the mouth, at the beginning of August, when the water was low, was estimated to be 25,000 cubic feet per second."

"During the summer, 35 latitudes were taken as checks on the micrometer and track-surveys and the magnetic declination was ascertained at a number of points. On the way out a micrometer survey was made of the Albany river from Fort Hope to the Opichewan, a distance of 26 miles. The Canadian Pacific Railway was reached by way of Lake Nipigon. Brook trout of good size were caught plentifully in the rapids along this route. Mr. McInnes arrived at Ottawa on the 22nd of September."

"In addition to the fossils obtained from the limestones, a collection of Pleistocene shells embracing 11 marine species, was made from the clays exposed along the Winisk river, of which Dr. Whiteaves has furnished the following list: *Pecten Islandicus*, Muller, *Mytilus edulis*, L., *Cardium ciliatum*, (Fabricius), *Seripes Grœnlandicus* (Gmelin), *Macoma calcarea*



(Gmelin), *Macoma Balthica*, L., *Mya truncata*, L., *Mya arenaria*, L., *Saxicava rugosa* L., *Buccinum tenue*, Gray, *Buccinum*."

"The following mollusks determined by Dr. Whiteaves, were found living in the Winisk river: *Limnæa stagnalis* L., *L. palustris*, Muller, *L. catascopium*, Say, *Planorbis trivolis*, S., *P. bicarinatus*, S., *Unio luteolus*, Lam., *Anodonta marginata*, S., *Spherium striatum*, Lam."

From the *Toronto Mail and Empire*, Sept. 13th, 1905.

Winnipeg, Man., Sept. 8.—Notice of proclamation appears in the *Canada Gazette* dated Aug. 19, whereby the district of Keewatin is detached from Manitoba and annexed to the North-West Territories.

Hon. Robert Rogers was asked this morning what his opinion was concerning the meaning and effect of the proclamation.

"It means," he said, "that another most villainous outrage has been perpetrated upon this Province by Sir Wilfrid Laurier and his ecclesiastical adviser crystallized into the form of a proclamation carrying the endorsement of his whole Cabinet.

"In this proclamation, the whole of the District of Keewatin, which for 30 years has been annexed to Manitoba, and which has been governed by the officers of law and order of this Province during that period, has been taken away from us."

"Do you mean that this has been done without the knowledge of Parliament."

#### UNDERHAND BUSINESS.

"Yes," replied Mr. Rogers. "It has been done in most underhand, secret fashion. When the new provinces were granted autonomy, certain portions of the North-West Territories were left outside of Saskatchewan, presumably because they lay to the north of Manitoba. A special Act was brought before Parliament to amend the Act respecting the North-West Territories, and providing for the future of this excluded territory. This was assented to on July 20, 1905.

"Now, if Sir Wilfrid was not ashamed of this new insult to Manitoba, he should at least have asked Parliament to endorse his action in detaching Keewatin from this Province. This, however, evidently did not suit his purpose, for the reason, no doubt, that he would have been called upon to show how it could be to the public advantage to do this.

"No language could possibly be used that would be too strong in criticizing Sir Wilfrid's course in this matter. When the Act referred to was introduced last session to provide for the future of the North-West Territories, it specially exempted Keewatin from its operations, just as much as Manitoba, Saskatchewan and Alberta were excluded.



### ASSUMES POWER UNDER OLD ACT.

“Under an old Act of 1876, Sir Wilfrid now assumes to have the power vested in himself to detach the whole of the Keewatin district from this Province. Any individual can see that such an interpretation was never intended by the Parliament of Canada in passing the Act of 1876.

“Under Laurier’s garbled interpretation of this clause the whole of Keewatin district is detached from us by one stroke of a pen, without the slightest explanation as to the reason why, although as late as Feb. 20th last Parliament expressly excluded Keewatin from the reconstituted North-West Territories, and Sir Wilfrid then did not dare to give any hint of the new humiliation he had in store for Manitoba.

“As Manitobans, we are certainly entitled to know from Sir Wilfrid why this sudden change on his part, for it must be remembered that no longer ago than on the 20th of July last the Parliament of Canada, at the instance of the Government, declared by their own act that it was not to the public advantage to have Keewatin part of the North-West Territories.

### REVERSES DECISION OF PARLIAMENT.

“Notwithstanding this, we find that Laurier in less than a month steps in and undertakes to reverse Parliament’s opinion, without the slightest explanation as to where such an act can be shown to be in the public interest, and to the public advantage, to shear, cut, carve, penalize and punish little Manitoba to the extent that is being done even behind the back of Parliament, and by means of a doubtful and misleading interpretation of legislation over thirty years old.

“It is one of the most contemptible, high-handed pieces of work that any Minister ever dared to perpetrate on the people of any part of Canada. The only remaining act, I fancy, which is left within Sir Wilfrid Laurier’s power, by which any further injury could be done us, is to wipe the Province off the map entirely.

“I am satisfied all good citizens will revolt at these repeated attacks on our Province by the Premier of Canada.”

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From the *Toronto Globe*, Sept. 13, 1905.

Premier Whitney expects to hear from the Dominion Government in regard to the suggestion made in a communication from Sir Wilfrid during the recent session of the Legislature, that a conference be held on the subject of the division of the unorganized territory north of the present boundary of Ontario. He had heard nothing officially of the matter since the communication mentioned, but had no doubt that he would.



This was the answer he gave last night to questions as to whether he had notice press despatches relating to an interview at Winnipeg with Hon. Robert Rogers, based on an allegation that a proclamation was to issue detaching from Manitoba and annexing to the North-West Territories the district of Keewatin. In that interview Mr. Rogers is quoted as having referred to the reported proposal as "another most villainous outrage" perpetrated upon Manitoba by Sir Wilfrid Laurier "and his ecclesiastical adviser, crystallized into the form of a proclamation carrying the endorsement of his whole Cabinet."

The communication to which Premier Whitney refers was an answer to a letter which he wrote to the Dominion Prime Minister on March 2, saying that press despatches were appearing in regard to an alleged proposed division among the Provinces of Keewatin Territory, and urging that before the details of such decision be decided upon, or even considered, the Province of Ontario be allowed to submit to the Dominion Government for consideration with reference to such proposed division its claims to that portion of such territory as it may fairly urge should be allotted to it."

On March 4, Sir Wilfrid replied, acknowledging receipt of Premier Whitney's letter, and adding:—"You have anticipated the action which I intend to take. The Province of Manitoba has asked us to have its territory extended to Hudson's Bay. It seems to me that this is a matter in which the Province of Ontario might have an interest. I will ask the Secretary of State to send you an official copy of the claim of Manitoba. In the meantime I send you one under cover."

This correspondence was laid on the table of the Legislature on March 27

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From the *Mail and Empire*, Sept. 14, 1905.

Hon. Robert Rogers, Minister of Public Works for Manitoba, was in the city yesterday on his way to Montreal on private business. When seen last night by a *Mail and Empire* representative he had very little to say along political lines, except that he reiterated and emphasized the points in the interview which he gave a few days ago in Winnipeg, regarding the annexation of Keewatin to the North-West Territories.

"Have you seen what Premier Whitney has to say upon the subject?" Mr. Rogers was asked.

"Yes, sir, I see that Mr. Whitney says that he expects to hear from the Ottawa Government before the matter is settled and that he was told that the older provinces would have a voice in the decision of the question." Continuing, Mr. Rogers said that he knew that the facts were that the disposition of Keewatin had already been arranged for irrespective of the older provinces, and that, in spite of what had already been promised by Sir Wil-











of the coming conference between the Dominion and the interested Provinces. As to imposing the separate school system on the territories, the idea was never thought of or contemplated. Keewatin has always been administered from Ottawa. It will continue to be so administered, the administrator being Lieut.-Col White, Comptroller of the N. W. Mounted Police, and an appointee of the late government."

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From the *Toronto Globe*, Sept. 18th, 1905.

(Special Despatch to The Globe.)

Ottawa, Sept. 16.—The following further statement regarding the Keewatin question may be regarded as expressive of the views of the Dominion Government, and was made by a member of the Ministry in refutation of Mr. Rogers' assertions:—

"The grievance appears to be that Keewatin has been detached from Manitoba. If there has been no such detachment there is no grievance, at least none in which Mr. Rogers as representing Manitoba has any special property. Now, the truth is that Keewatin was never in any way attached to the Province of Manitoba. Before the Act of 1876 it formed part of the Northwest Territories. By that Act it was detached from the Territories, but it was not annexed to Manitoba or in any way subjected to the government of the Province, nor has anything of the sort been done by or under subsequent legislation. It was, on the contrary, expressly set apart as a separate district of the Northwest Territories of Canada by the name of the district of Keewatin, with a Government and constitution of its own. It is true that the Lieutenant-Governor of Manitoba, or the person acting as such Governor, was to be *ex-officio* Lieutenant-Governor of the district, but this was a matter merely of expediency and convenience. At that time the Lieutenant-Governor of the Province was the Dominion officer to whom the duties of the Executive of the new district could most conveniently be assigned. The two offices, though vested in and exercised by the same person, were entirely distinct, and the advisers of His Honor in the government of Manitoba had no part or lot whatever in the government of Keewatin, as to which the Act provided for the appointment of a Council to aid the Lieut.-Governor in the administration of the affairs of the district.

#### WHOLE BUSINESS PROVISIONAL.

"The discussion in Parliament at the time the act was introduced, as well as the statute itself, now embodied in chapter 53 Revised Statutes, show clearly that the whole business—the establishment of the district, the provision for its governing and that for the administration of the law therein—was provisional in its character. Sub-section 2 of section 1 of the Act of 1876 (now sub-section 2 of section 3 Revised Statutes) contained a pro-



vision under which the Governor-in-Council has acted in re-annexing the district to the Northwest Territories. Mr. Rogers pretends to consider it doubtful whether this provision is sufficient to authorize the proclamation of annexation, but he does not venture to argue the point. The statute is recited verbatim in the proclamation itself, and the power it gives is really not open to question. The Governor-in-Council is expressly empowered to detach any portion of this district therefrom and re-annex it to that part of the Northwest Territories not included in the district, and his power naturally carries with it and involves the power to restore the whole (*i.e.*, all the parts) of the district to the Territories. Mr. Rogers states that the district has for thirty years been governed by the officers of law and order of his Province. A perusal of the Revised Statutes will show that his accuracy in this statement is on a par with that displayed by him when he claims that the district was annexed to the Province of Manitoba. The Lieut.-Governor by statute is given power to appoint Justices of the Peace. There are provisions in it for the appointment by the Governor-in-Council of stipendiary Magistrates, and to these two classes of Magistrates, who have no connection whatever with Manitoba, is entrusted the administration of criminal justice in the great majority of cases.

#### SUPERIOR COURT JURISDICTION.

"Jurisdiction was given to the Court of Queen's Bench in such exceptional cases as required resort to a higher court, but in practice it was the nearest Superior Court, and it might be here pointed out that there was nothing exceptional in this, and nothing involving anything like 'annexation to Manitoba.' Similar provision is made in the law as to the other unorganized or only partially organized portions of Canada outside the Provinces—that is to say, the Superior Courts of the adjoining Provinces are given jurisdiction to try serious criminal cases arising within such territory. Indeed, upon this alleged ground, Mr. Rogers might until comparatively recently have claimed with equal propriety the whole of the Northwest Territories as an appendage of Manitoba, for the provisions above referred to, as well as others upon which he might base his claim to Keewatin, were common to the Northwest Territories Act and the Keewatin Act.

#### REASON FOR THE ACTION.

"As a reason for the action taken, it may be sufficient to refer to the complete separation between the western and the eastern portion of the Northwest Territories, as now defined by statute, which would result from the maintenance of the District of Keewatin as a separate district with a distinct Government. The anomaly of such a state of affairs is apparent on the face of it, but it is perhaps not possible for those not familiar with the conditions to realize how serious are the difficulties which would be presented to those responsible for the conduct of the government and administration of



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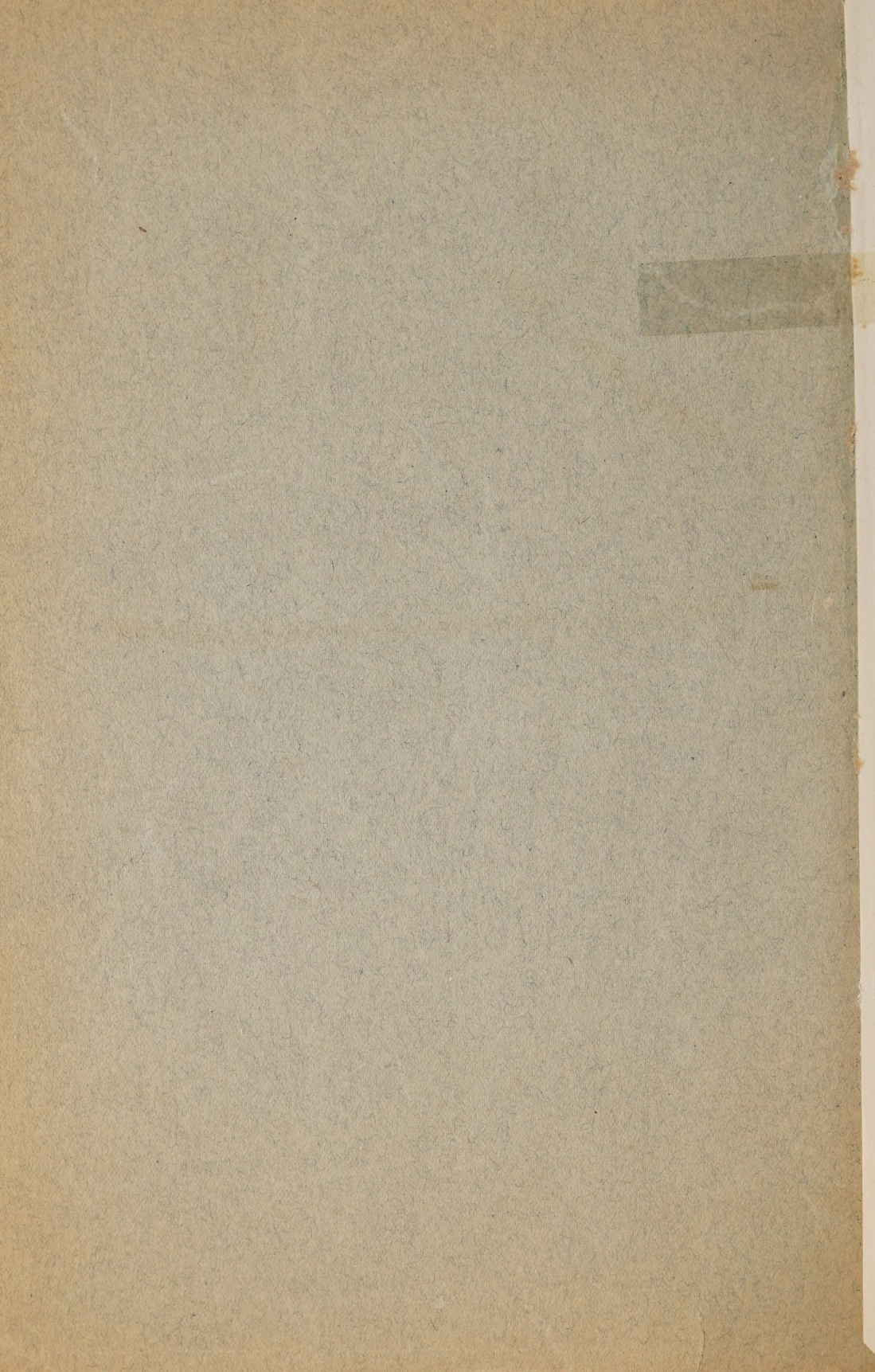
justice. The new Commissioner of the Territories, however (Lieut.-Col. Fred White, Northwest Mounted Police), must be well aware of them, and it is safe to say that he must recognize the expediency, if not the absolute necessity, of the change which has been made."

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